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From Strong Lifters to Strength Coaches:

A Grounded Theory of Central Texas Division I Strength and Conditioning Coach Education

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From Strong Lifters to Strength Coaches: A Grounded Theory of Central Texas Division I Strength and Conditioning Coach Education

by

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Thesis

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Master of Science in Kinesiology

The University of Texas at Austin

December 2015

Abstract

From Strong Lifters to Strength Coaches: A Grounded Theory of Central Texas Division I Strength and Conditioning Coach Education

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The University of Texas at Austin, 2015

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Objective: collegiate strength and conditioning coaches continue to gain greater prominence as a subject of research in sports studies literature. However, information is lacking on the specific educational experiences of strength coaches, particularly related to why strength coaches pursued the educational options they did and how they feel those options impacted them during their careers. Nineteen (14 men and 5 women) full- or part-time strength and conditioning coaches at NCAA Division I universities in Central Texas were interviewed about their educational experience and how they learned how to be a strength coach. Semi-structured interviews were conducted and then transcribed, coded, and analyzed in the methods consistent with grounded theory. A theory was formulated that identified major educational experiences of coaches and how those experiences correlate to perceptions of coaching proficiency. It was found that mentorship experiences, regular rigorous exercise, and continuous self-education based around projects, were essential educational experiences for these coaches.

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Chapter 1 – Introduction

The dynamic play, faster speed, and increased size of collegiate athletes are thanks in large part to the efforts of strength and conditioning coaches. Collegiate strength coaches are responsible for designing and implementing exercise programs for athletes in the weight room and on the conditioning field (Coutts, et al., 2004). The formation of the strength coaching profession per se is a relatively new development (mid-twentieth century) (Shurley, 2013). The role and duties of strength coaches often fall somewhere between those of a sport coach and an athletic trainer. Strength coaches lead athletes through workouts several times a week to help prepare athletes' bodies to withstand the forces of sport and excel competitively. To accomplish their task, strength coaches spend many years in the weight room learning how to coach combined with continuing professional education. In designing strength programs, coaches draw on a wide body of sports science research.

Sports science research has been primarily dominated by human performance research conducted by exercise physiologists, biomechanists, and other sport scientists. Leading journals, such as the National Strength and Conditioning Association's (NSCA's) "Journal of Strength and Conditioning Research," have made this information available to strength coaches and academics alike. As Magnuson & Peterson (2012) discuss,

> A sizeable body of scholarly research has developed within the field of strength and conditioning. This literature base… includes in-depth physiological research about muscular hypertrophy, strength, power, and flexibility as well as comprehensive explanations… about how strength coaches can more effectively teach exercise techniques and design training routines for their athletes/clients. (p. 67).

An important distinction needs to be made between literature on the methods and results of strength and conditioning regimes and the literature about the strength and conditioning *coaches* themselves, which is the focus of this research. Research about strength coaches in the last few decades has focused on leadership, coaching behavior, and strength and conditioning strategies employed by professionals continues to emerge but still has a long way to go (Magnusen & Peterson, 2012, p. 67). Ian Jeffreys (2014) described the state of this type of research on strength coaching, particularly related to education, in a recent article. He says:

> Despite the fact that the term "strength coach" lies at the heart of the original formation of the National Strength and Conditioning Association (NSCA), … there is currently a paucity of literature as to what constitutes effective strength and conditioning coaching. Even in the broader realm of coaching, where a far greater research base exists, effectiveness or expertise is still ill defined. This provides a challenge to making universal recommendations for coach education and development programs. (p. 3).

The relatively recent development of the strength coaching profession is due, in part, to stigmas surrounding weight training through most of the modern era preceding the emergence of the strength coach. The position of avoidance of weight training for athletes in the mid-twentieth century is discussed by J. Todd and Shurley (2012), noting

> Strength training for athletics underwent a cultural and pedagogical shift in the U.S.A. in the 1950s and 60s. Before that time, most athletes avoided weight training because they had been warned by coaches, doctors, or sports scientists that weight training would make a person "muscle bound." (p. 3177).

The concern over 'muscle-binding' dominates much of the historical literature. Terry Todd has written extensively on this topic, especially as it relates to the training of

athletes at the University of Texas at Austin, where he played varsity tennis and received his education. He notes "as late as 1963, the trainer at the University of Texas, Frank Medina, believed that no one needed more than 50 pounds in any exercise, no matter how big they were" (T. Todd, 1985, p. 39). In the same article, Terrence Todd notes this trend prevailed at other schools as well (p. 40). That pattern is echoed in scholarship by Jan Todd and Jason Shurley in their analysis of NSCA-founder Boyd Epley's early days as a University of Nebraska pole-vaulter (Shurley and J. Todd, 2012, p. 3178). Like Epley, there were a few strength coaches in the 1960s and 1970s who employed weight training despite this, such as Alvin Roy, "the first modern strength coach," whose belief in 'muscle-binding'

> Was shattered upon witnessing the speed and flexibility of top-flight weightlifters, particularly John Davis at the 1946 World Weightlifting Championships in Paris…he was able to witness some of the most explosive athletes in the world tossing several hundred pounds overhead with unmatched quickness and dexterity. For Roy, this was tangible proof that the notion of weightlifting harming athletes was fallacious indeed. (p. 3181).

A gym owner in Baton Rouge, Louisiana, Roy first made a name for himself as high school strength coach working with his alma mater, Istrouma High School (Shurley, 2013). There he trained Billy Cannon and Jimmy Taylor, who became star running backs for the LSU Tigers. Following a disappointing 1957 season, Roy approached LSU Tigers head coach Paul Dietzel about training his team. Wary of muscle-binding, but aware of Roy's success with Cannon and Taylor, Dietzel brought him on (Shurley, 2013). In 1958, the Tigers became "the only major untied and undefeated team in the country" in part because of Roy, the country's first strength coach (Shurley, 2013, p. 196).

In the two decades after Alvin Roy's first successful year with LSU, strength coaching grew throughout the country. The early growth in those coaches led to the formation of the NSCA and its founding in 1978, thanks to NSCA-founder and University of Nebraska strength coach Boyd Epley (Shurley & J. Todd, 2012). The need for the formation of a national organization of strength coaches was captured well is an anecdote when Epley was introduced to the commissioner of the Southeastern Conference, Boyd McWhirter,

> The commissioner enquired about the exact nature of Epley's position at Nebraska and then asked if Alabama had anyone in a similar position. Surprised that a conference commissioner could be unaware of the existence of professional strength coaches, Epley decided that, to ensure the success of his fledgling profession, some kind of unification and professionalization of the field was in order. Consequently, he sent a letter to schools around the country to compile a national directory of strength coaches in 1978... He got back 377 letters and compiled the results into a 90-page directory titled, The National Directory of Strength Coaches. (Shurley & Todd, 2012, p. 3186).

This early history of the NSCA, also documented by McQuilkin & Smith (1995), reveals an early need at looking at the qualifications for NSCA membership that generated questions at the first conference in Chicago in 1979 like, "Were there specific educational standards that needed to be met? Was there a need for certification? Should the association be limited only to professionals in the field? What actions constituted membership forfeiture?" (p. 12). The second question, addressing certification "received overwhelming support from NSCA members" and McQuilkin & Smith note at this conference "the professionalization of the field through certification was a crowning achievement of the organization" (p. 12). That certification, the Certified Strength and

Conditioning Specialist, or "CSCS," was established in 1985 and quickly became the preferred credential in the field (NSCA History, 2015).

From those early conferences and its founding in 1978 with 76 coaches, the NSCA (according to its website) has expanded beyond the United States to include "nearly 30,000 members in 72 countries and become the leader in the research and education of strength and conditioning professionals" (NSCA History, 2015). In very large part due to the NSCA's efforts, the profession of strength coaching has continued to expand and develop in that time despite stereotypes of "muscle-binding" from weight lifting and strength coach as "meatheads" without a concern for sports science and sports medicine research in designing training programs.

As the NSCA had formed in 1978, in 2000 a group of strength coaches aiming to maintain the focus of their professional organization on collegiate athletics formed the Collegiate Strength and Conditioning Coaches Association or "CSCCa" and that same year began offering their own certification to match the CSCS offered by the NSCA—the Strength Conditioning Coach Certified or "SCCC", which became accredited in 2014 (CSCCa Historical Development, 2015). See Figure 1.1 for a timeline of the strength coaching profession to date.

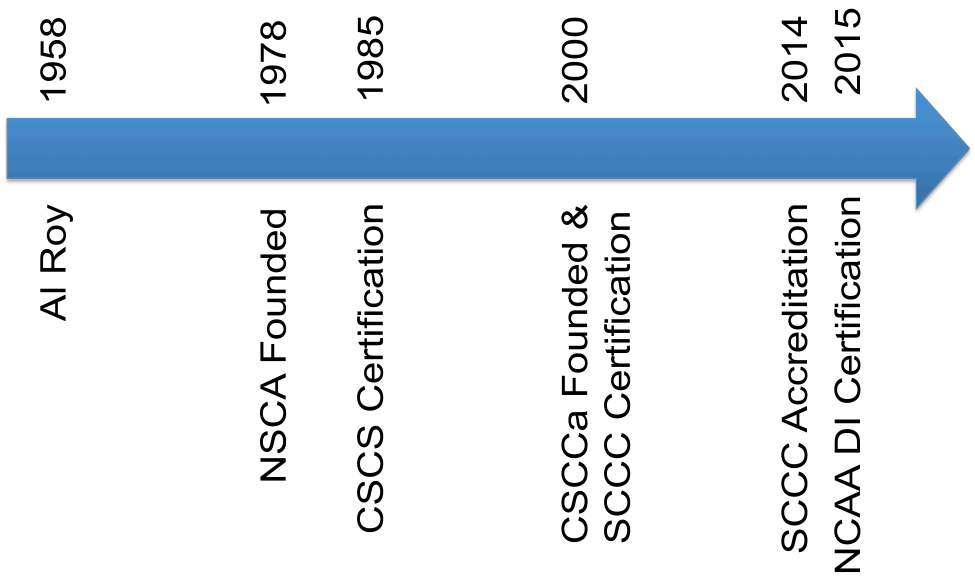

Figure 1.1: Collegiate Strength and Conditioning Coaching Timeline

The most recent event (seen in Figure 1.1 above) to effect the profession is the new National Collegiate Athletic Association (NCAA) rule that mandates all strength and conditioning coaches at the Division I level be certified. Introduced in 2014, NCAA Proposal No. 2013-18 states that "certified and maintain certification" though a nationally-accredited strength and conditioning certification program (NCAA DI Conduct, 2014). According to material accompanying the proposal, institutions can indicate a preferred program but it must adhere to these standards:

> A nationally accredited strength and conditioning certification program is one that is: a. Accredited by the National Commission for Certifying Agencies; b. Requires an undergraduate college degree; c. Requires a continuing education component; and d. Requires current first aid, CPR and AED certification. (NCAA DI Conduct, 2014).

In this climate where certification is now required at the highest level of collegiate athletics in the United States, questions of coach education and training are as important

as ever. The purpose of this study is to investigate the means by which collegiate strength and conditioning coaches are educated and trained to perform their jobs. As strength and conditioning coaches take on a greater role and seek more legitimacy within athletic departments, the question of how to make strength coaching more professional has come to the forefront in the field. In this ongoing discussion of professionalizing strength coaching, attaining proper education and establishing what these standards should be remains a crucial task for the field. Specifically, this study will document the educational backgrounds of strength coaches and—from the insight provided by understanding those educational experiences—provide recommendations that can guide developing strength coaches, current strength coaches, and the certifying agencies (NSCA and CSCCa). Now more than ever strength coaches are tasked with having a strong base of knowledge in the exercises sciences driving their exercise program design and coaching. Understanding the role of exercise science as one part of a strength coaches' education is critical.

Chapter 2 – Literature Review

> As men and women working in this field of strength and conditioning from all different perspectives, it is vital that you approach your practice scientifically. Many years ago, one strength coach said, "It does not take any knowledge to get strong," and I begged to differ with that statement then as I do now. The challenge of understanding how to do something better is what keeps the practice of strength and conditioning exciting. If we knew it all now, what would be the challenge or struggle? When I was an athlete, it was the struggle of the game that validated the joy of victory. So it is with the struggle for optimal training practices, as you cannot sit back and enjoy your charges with any satisfaction unless you know you struggled well to give them the best of what cutting-edge knowledge there is. The price you pay is one of study and struggling for understanding beyond the training mythologies. (Kraemer, 2005, pp. 91-92).

William Kraemer's call to action for strength coaches to continue to educate themselves and to think scientifically in "Research: The Struggle for Understanding" is a powerful message coming from arguably one of the most respected sports scientists in America. One of the more dominant themes throughout strength coach literature is the education and knowledge of strength coaches. Because sports science dominates the field and the research in strength and conditioning so heavily, it is considered one of the dominant and critical knowledge domains. Shurley and J. Todd described how NSCA-founder Boyd Epley "was serious about the scientific aspects of training" and adapted "science to strength coaching by applying emerging theories about sport-specific training and his willingness to constantly revise the program" (Shurley & J. Todd, 2012 pp. 3183-3187). The revision and creation of such periodized exercise programs (simply referred to as "programming") can be challenging for coaches to implement due to lack of scientific knowledge (Kraemer, 1997) and limited or unclear literature (Cissik, et al., 2008). The knowledge of other associated scientific fields is discussed in a 2012 study of

nutritional knowledge of collegiate athletes, sport coaches, strength coaches, and athletic trainers. Despite the inclusion of strength coaches in this study, the authors noted that "no researchers have examined [strength and conditioning specialists] as a single group" (Torres-McGehee, et. al., 2012, p. 209).

Other researchers employ an entirely theoretical approach to this issue of coach education, focusing on scholarship from educational psychology and pedagogy studies in designing what the authors believe to be an appropriate model for strength coaching. These nonempirical studies are published within the *Strength and Conditioning Journal* (SCJ), the NSCA's professionally-oriented journal, rather than the *Journal of Strength and Conditioning Research* (JSCR), the academic and research publication of the same organization, in which articles from Kraemer, J. Todd, and Shurley can be found. For example, one such *SCJ* article is a 2014 paper by Gilbert & Baldis that describes a five-feature model of strength coach education designed for coach application but without any empirical aspect. What this literature has in common is the identification of an educational need for collegiate strength and conditioning coaches. Dorgo (2009) writes on the importance of a well-trained and educated strength coach, recognizing how important coach knowledge is for athlete preparation. Unfortunately,

> Coach education programs are either non-existent or often do not provide a thorough knowledge base for practical coaching. Coaching manuals often present the knowledge basis for coaching differently from the practical coaching expertise. Experiential knowledge and informal education in coaching appear to have a special significance in the development of expertise. Consequently, there is a need to define the knowledge base necessary for effective coaching. (p. 17).

Strength coach learning can be broken down into several forms, as described by Hanratty & O'Connor (2014, p. 47) in their study of elite Australian rugby strength coaches. These forms are:

- **Formal learning** which "involves a situation that is characterised by compulsory attendance, standardised curricula and culminates in certification, commonly seen in the form of many large-scale coach education programs (Nelson et al., 2006)."
- **Non-formal learning** "is defined as "any organized, systematic, educational activity carried on outside the framework of the formal system to provide select types of learning to particular subgroups in the population (Coombs & Ahmed, 1974, p. 8)."
- And **informal learning** which is "the lifelong process by which every person acquires and accumulates knowledge, skills, attitudes and insights from daily experiences and exposure to the environment" (Coombs & Ahmed, 1974, p. 8)."

Examples of these types of learning in the words of the rugby strength coaches in the study (on Table 2.1 below) demonstrated how each type of learning can look for a strength coach.

Meaning unit	Theme	Category
You know, you do your university degree, you get your knowledge... Then as you're doing all the practical experience you're using that information you've got from your degree... It just helps in your development. (SC3)	Tertiary Education	Formal
... There was courses on recovery, there was courses on speed, there was courses on agility, there was courses on power, there was courses on field sports, the physiology of field sports. It was basically choosing courses that we felt were adaptive to what we needed to be better at... There's no doubt that every course you do, you will get something out of, regardless of what it's about. (SC5)	Coaching clinics/seminars/conferences	Non-formal
I think you know what the players are going through. You can have all the science and all the technology and all that in the world, but you've gotta sometimes understand just exactly what it's like to go out there... you don't know what that feels like until you've been there. So sometimes if you've experienced it, you can become more empathetic with the way you train. (SC7)	Previous Athletic Experience	Informal

Table 2.1: Coach forms of education in Hanratty & O'Connor, 2012 (p. 51)

Although the strength coaches in the Hanratty & O'Connor study are not collegiate strength coaches, they reflect the same kind of learning that take places. In their position with the athlete interaction of a sport coach paired with the support role and similar knowledge requirements of an athletic trainer, the amount of subject (exercise science) knowledge, technical coaching skill, and interpersonal skills needed to be an effective strength coach is substantial. The required subject knowledge spans a wide range of academic disciplines including basic biology and biochemistry, anatomy,

physiology, biomechanics, sports psychology, and nutrition (Dorgo, 2009). Such knowledge is easy to point to and test through certification exams, but the actual practical knowledge of the strength coach is not well defined but, if analyzed, could lead to significant improvements in how strength coaches are educated (Dorgo, 2009). In the same 2009 study, Dorgo built one such model of practical coach knowledge. An abbreviated version of this model is shown in Figure 2.1 below.

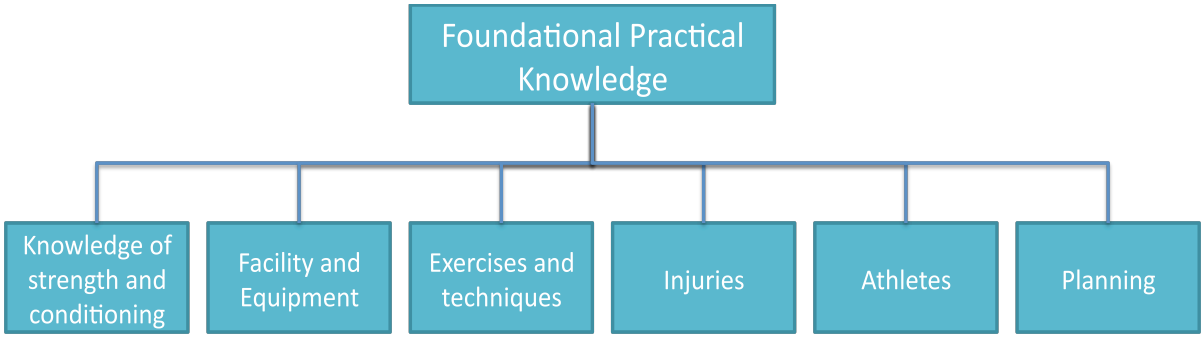

Figure 2.1: Foundational Practical Knowledge by (abbreviated from Dorgo, 2009, p. 18)

Beyond simple subject knowledge, this foundational knowledge encompasses the skills and associated knowledge need to address six key aspects of strength coaching. Gilbert & Baldis (2014) expand beyond only studying the technical knowledge required of strength coaches and describe how the skills of strength coaching function within the work environment of a weight room. They argue that strength coaches operate with three related types of knowledge: 1) professional knowledge (effectively coaching athletes), 2) interpersonal knowledge (communicating with stakeholders), and 3) intrapersonal knowledge (internal reflection).

WHO ARE STRENGTH COACHES?

Part of the literature on the education and professional development of strength coaches focuses on who they are – demographic information about the field that can put coaching behaviors and career choices into context. In a heavily male-dominated profession, the subject of gender in strength and conditioning has received relatively little attention, especially considering the depth of research in other areas of gender in athletics. The earliest study on women strength coaches was called "SURVEY: The status of women in the strength and conditioning profession" published in 1991 in the *Strength and Conditioning Journal* by Jan Todd, Dorothy Lovett, and Terry Todd (Todd, Lovett, & Todd, 1991). Since this early paper there have been few articles (such as (Brooks, et al., 2000), (Lee, Magnusen, & Cho, 2013), and (Massey and Vincent 2013)) as well popular writing (such as Carrasco, 2012) on the topic of women strength coaches. As Brooks and colleagues (2000) note, women strength coaches have had a specific underutilized position in university athletics, tending to be assigned disproportionally to women's sports (p. 491). At the Division I level, women are 5% of the strength coaching staff and 9%, only slightly more, at Division II schools. At the Division III level, there is better representation of women, making up 24% of strength and conditioning coaches (Brooks, et al., 2000, p. 491).

While studies on gender in strength coaching are limited, studies on race are even more rare. One of the only studies on the subject is the same 2000 study by Brooks, et al. that includes, of 53 participants (average age 31), four African American participants (one woman) and said of other non-white racial and ethnic groups that "overall, there was a lack of ethnic minorities represented in this study: 2 Hispanic men, 1 Asian or Pacific Islander man, and 1 woman listed as ''other'' (German, English, Spanish)" (p. 486).

The lack of gender, racial, and ethnic research in strength coaching literature is likely influenced by poor representation of these groups in collegiate coaching positions. The typical coach being a white male who was a collegiate football or track and field athlete with "the CSCS certification, and has an undergraduate degree in health, physical education, or recreation or exercise science" (Brooks, et al., 2000, p. 489). Later findings by Martinez (2004) found that the average coach, still a white (87-93%) male (98-100%), was slightly older (thirty-seven), and most often held the CSCS certification (72.5%) but may also hold the SCCC (36.25%) and USAW (16%) certifications as well (Martinez, 2004, p. 8).

NSCA AND CSCCA EDUCATIONAL RECOMMENDATIONS

The National Strength and Conditioning Association (NSCA) remains the dominant driver of strength and conditioning coach education in the United States followed by the newer and smaller Collegiate Strength and Conditioning Coaches Association (CSCCa). As the two certifying agencies, these entities decide much of the curriculum that shapes strength coaches—especially those certified in the last fifteen years—through websites, articles, test-prep materials and the NSCA's *Essentials of Strength and Conditioning* by Baechle and Earle (Baechle and Earle, 2008). This text—also used by CSCCa and countless university strength and conditioning classes—was first published in 1990 and contains sections on exercise science, testing, exercise and drill technique, program design, facility layout, and administrative skills (NSCA History, 2015). This book is particularly significant to strength coaches because it is used to prepare for the NSCA's Certified Strength and Conditioning Specialist examination as well as acting as a valuable reference when designing exercise programs.

The NSCA launched its certification program in 1985, giving coaches the title of Certified Strength and Conditioning Specialist or more commonly simply called "CSCS" in the field. Prior to sitting for the CSCS exam, the NSCA requires that application show proof of a bachelor's degree or chiropractic medicine degree from an accredited institution (college seniors may take the exam in their last semester of school) and current CPR and AED certification (NSCA: CSCS Certification, 2015). While an exercise science degree is not required, the NSCA recognizes undergraduate exercise programs that meet the "that emphasize strength and conditioning" (Kleiner, 1999, p. 8).

The CSCCa also requires a bachelor's degree and CPR/AED certification of its applicants for the Strength and Conditioning Coach Certified ("SCCC") examination (CSCCa: SCCC Certification Requirements, 2015). While not required, the CSCCa "strongly recommends" that the all strength coaches entering the field attain a master's degree and that degree(s) are in the exercise sciences or a related field (CSCCa: Bachelor's Degree, 2015). While both organizations have established that a bachelor's degree agree a broad post-high school education is necessary to be a strength coach, there is currently no specific curriculum specified by either.

While both agencies require coaches to pass a written exam to be certified, the CSCCa distinguishes itself through requirements for a 640-hour mentorship with an approved CSCCa-certified master strength coach (holding the MSCCC distinction) prior to sitting for the written exam. Additionally, the SCCC candidate must submit and defend a strength and conditioning program and pass a practical test in which they demonstrate and properly teach several essential exercises.

FORMAL EDUCATION: THE CLASSROOM AND CERTIFICATION

In addition to the need for exercise science knowledge, the need for standardized curriculum in strength education has also been written about in the literature on strength coaching. Articles range from general discussions of mentorship and knowledge acquisition to specific descriptions for curriculum. Many are simple and discuss basic goals of theoretical and practical knowledge acquisition (Dorgo, 2009). Most thorough among the studies of curricula is a 2014 paper by Massey & Dwayne that suggests strength coach educational curricula should include the following exhaustive list (Massey and Dwayne 2014, p. 25):

- Human anatomy and physiology
- Sport physiology
- Kinesiology/biomechanics
- Sport psychology
- Sports nutrition
- Scientific principles of strength and conditioning
- Resistance training and conditioning - laboratory or activity class
- Exercise techniques/exercise prescription with an emphasis on anaerobic exercise
- Program design in strength and conditioning. This should include not only the makeup of the overall training program but also the structuring and organization of individual exercise sessions to achieve specific goals
- Sports pedagogy
- Motor learning
- Cardiopulmonary resuscitation and first aid
- Care and prevention of athletic injuries
- Tests and measurement—To include possible hands-on component
- Administration and management issues in strength and conditioning programs
- Practicum experiences

While these specific domains of knowledge are certainly beneficial for the strength coach, strength coaches vary in the degrees that they attained. Since a bachelor's degree is required but a specific major (e.g. exercise science) is not, the wide variation in

education described by Brooks, et al. (2000, p. 486) may continue. Those authors found that while a majority of strength coaches in their study majored in exercise science (or a related field) as undergraduates, many coaches had unrelated majors such as speech, education, fine arts, geography, and criminal justice, to name a few. At the graduate level, many more coaches tended towards the exercise sciences with a couple of studying dance, fine arts, or history (Brooks, et al., 2000).

Subject of education, it seems, is less important than whether or not a certain level of education has been attained. It should be said that exercise science is still the most common undergraduate major for strength coaches at 26% (Martinez, 2004, p. 8). Beyond the required bachelor's degree, the acquisition of a master's is common with between 68-79% of Division I coaches having attained such a degree. The master's degree is a level of education that coaches felt is essential for their profession (though a doctorate was considered very nonessential by these coaches). For those with a master's, 17.3-37.5% are in exercises sciences (Martinez, 2004, p. 8). Given that coaches were probably coaching when attaining a master's degree, this increased proportion of exercise science study is logical.

Australian strength and conditioning coaches see similar benefit from higher levels of education in strength coaching with a notable difference being the ability of higher degrees (this time including a doctorate) as "a way for outsiders to break into the industry" (Dawson, et al., 2013, p. 1427). As one coach in the study said, "undergrad is no longer good enough; you've got to be doing post grad or Masters in strength and conditioning at least" (p. 1427). Coaches' feelings about the benefits of education are tempered by the need for real-world weight room experience. Another coach noted,

> I think qualifications are one thing but it's about understanding how those transfer in a practical situation. I think the exercise science courses that I've done have

> been very good in terms of knowledge base but a key gap is getting the experience (Dawson, et al., 2013, p. 1427).

Beyond attaining at least a bachelor's degree, and especially since the 2014 certification decision by the NCAA, the need to become certified if essential for collegiate strength and conditioning coaches. In the Brooks, et al (2000) study, 29 of the 53 participating coaches said that it was "very important" to have a strength and conditioning certification and twenty-one of those coaches had their CSCS (p. 486). As those coaches were interviewed in 2000, or likely 1999, the only certification available was the CSCS. The Martinez (2004) study four years later echoed the belief in the CSCS and showed that the SCCC (and MSCCC) had yet to gain any traction with the majority of coaches and were considered nonessential. The NSCA's Certified Personal Trainer (NSCA-CPT) credential was considered very nonessential in the Martinez study (2004) though much of the content of the CPT exam is comparably rigorous to the CSCS examination (Baechle & Earle, 2004).

MENTORSHIP AND COACHING EXPERIENCE

A college degree and proof of certification are now required for Division I strength coaches, but much of learning how to be a strength coach does not come from these formal settings. For such a modern profession, strength coaching still follows an apprentice-mentor model (much like traditional professions) as young developing coaches intern, volunteer, or work as a Graduate Assistant (GA) under the tutelage of a mentoring coach (Chiu, 2010). This relationship helps hone the "multiple and diverse forms of knowledge to effectively and ethically improve athletic performance" (Gearity, Hudson, & Murray, 2014, p. 70). As described by Hanratty & O'Connor (2012),

> Mentoring has been seen as an effective experience which allows coaches to develop their skills as a coach. Studies have shown that coaches who were mentored during their athletic and early coaching careers gained valuable knowledge that improved numerous aspects of their coaching. (p. 47).

These mentorship experiences help develop coaches' skills interacting with athletes and implementing programs. Martinez (2004) found that experience as an assistant strength coach at the Division I level, an assistant strength coach at any level, or as a graduate assistant strength coach at any level was considered essential experience in the field. Conversely, experience coaching powerlifting or Olympic lifting or working as a personal trainer were all considered very nonessential to strength coaching. So important are these mentor-apprentice relationships to the field of strength and conditioning that the NSCA offers $10,000 year-long stipends to work "with a strength coach who has the NSCA Registered Strength Coach Distinction (RSCC, *D)" (Magnusen & Peterson, 2012, p. 68). Mentorship is equally, if not more important, to the CSCCa. To sit for the SCCC certification exam, coaches have to complete a 640-hour internship with an approved master strength coach (holding the MSCCC credential).

In addition to learning how to correctly perform strength and conditioning exercises and drills from their mentors, a strength and conditioning apprenticeship

> Includes the development of cognitive skills as well as the socialization of mentees into both formal and informal organizational norms and behaviors. In other words, the mentor–mentee relationship can develop into a powerful process through which apprentices can learn about the ins and outs of organizational behavior as well as what skill sets are required to thrive in the intricate jungle of interpersonal relationships, conflicting personalities, and competing personal and/or organizational objectives (Magnusen & Peterson, 2012, p. 68)

Such apprenticeships then develop both the physical and cognitive abilities of the developing strength coach. In Magnusen & Peterson's (2012) model, this is done

through modeling (e.g. observing a workout), scaffolding (e.g. intern leads a workout under supervision of their mentor), and fading (intern leads a workout without mentor present) for the development of physical skills. The same three steps are used for the development of cognitive skills: modeling (e.g. intern observes mentor's meeting with sport coach), scaffolding (e.g. intern participates in meeting with mentor and sport coach), and fading (e.g. intern meets with sport coach individually).

EXPERIENCE AS A COMPETITIVE ATHLETE

The background of strength coaches as former athletes and/or weight trainers and lifters recurs throughout the historical literature on strength coaching. NSCA-founder Boyd Eply "was already a serious student of strength and conditioning practices" and trained himself at Nebraska based on his knowledge of "bodybuilding, powerlifting, and weightlifting" (Shurley & Todd, 2012, p. 3178). The use of lifting for rehab, such as Epley did, is discussed in the history of Dr. Thomas DeLorme and his system of "progressive resistance exercise" in the rehab of World War II soldiers (J. Todd, Shurley, & T. Todd, 2012, p. 2913). Such literature is used to, in part, describe they ways that strength coaches were able to employ weight training with medically-sound best practices in eras when weight training was still seen as dangerous.

Hanratty & O'Connor (2012, p. 47) note that strength coaches learn to coach from their experience being coached as athletes themselves. They cite Gilbert, et al. (2006):

> [The study done by Gilbert, et al.] revealed that a minimum of several thousand hours accumulated as an athlete was a common characteristic of the coaches involved in their study, suggesting a direct correlation exists between playing experience and later success as a coach (p. 47).

Martinez (2004) found that in addition to playing traditional sports like football (73.75% of participants) or track and field, collegiate strength and conditioning coaches also had experience with competitive bodybuilding, powerlifting, and Olympic-style weightlifting (p. 8). While sport and strength sport experience was common among coaches, it was considered very nonessential experience by strength coaches at the Division I level. However, those same coaches named playing college or amateur sports as somewhat essential experience for strength coaching.

SELF-STUDY AND READING

The last theme that comes up in the literature is informal education pursued by strength coaches to further their understanding of a scientific training concept or to address another project outside their usual expertise. While not discussed in many studies, engaging in reading was a consistently high pursuit by participants in studies. In Hanratty & O'Connor's (2012) study, "all coaches in [their] study constantly read and researched numerous topics relating to the S&C field to expand on their existing knowledge" (p. 58-9). This reading material covered books, magazines, journals, health and fitness publications, and internet research. (Hanratty & O'Connor, 2012) go on to say

> Reading has been commonly cited in the literature as a significant learning avenue to expand coaching knowledge... Bloom and Salmela (2000) identified that the coaches in their study possessed a desire to continually learn and develop their knowledge, actively reading and researching to do so. This characteristic was highly evident in the coaches of the current study, with reading providing an effective avenue for learning. Therefore, these findings promote reading and researching as an effective avenue to increase a coach's knowledge in all aspects of the S&C field (p. 59).

Chapter 3 – Methods

The education of collegiate strength and conditioning coaches in the current literature shows the important role that experience as an athlete, mentorship, self education, and the influences of the NSCA and CSCCa have on strength and conditioning coaches as they develop from intern to coach and thereafter. Throughout much of this literature, the influence of these varied experiences are explored somewhat superficially through the collection of quick survey data or qualitative studies that lack enough participants to delve into strength coach education in the depth that is needed to understand why coaches made the choices they did in their education. Because the purpose of this study was to understand *why* coaches chose certain educational options and *what* experiences have proved formative upon reflection, it was necessary to speak with enough coaches in sufficient depth to reveal and understand their educational experiences.

Research Design and Philosophical Assumptions

The data collected for this study was transcribed, loosely structured, interviews with current full-time and part-time Division I strength coaches in Central Texas. The researcher functioned as an interviewer and analyst in this study. These interviews did not require the researcher to focus on their feelings or personal thoughts to the level that ethnographic methods like participant observation may. The focus of this study is on the participant, not the researcher. Interviews were conducted and data analyzed in a method consistent with the grounded theory framework discussed and developed mostly notably

by theorists such as Glaser, Strauss and Corbin, and Charmaz (the "constructivist" method) (Weed, 2009).

Qualitative research, in general, seeks to understand qualities of human behavior, experience, and meaning in a systematic, methodologically focused, way. Like quantitative research, this class of methodology is driven by the research question that is being asked. When a researcher is interested in a social process or socially constructed meaning, for example, a qualitative approach may be better able to answer that research question than a quantitative one – and so a qualitative design was employed by this study. The qualitative researcher collects data in the form of field notes, interviews, documents, and personal observation (depending on the method). Research design (in quantitative and qualitative) begins with grounding in several philosophical assumptions based on an interpretive framework (Cresswell, 2013). While a quantitative study may approach research questions from a postpositivist framework, this study (as with many qualitative studies) used the framework of social constructivism to investigate the problem of how collegiate strength and conditioning coaches were educated and trained to perform their jobs. Along with this framework came several philosophical assumptions. Ontologically, social constructivism acknowledges multiple realities that are structured through the lived experiences of research participants. This is to say that lived experience shapes individual personal realities, not that lived experience shapes the greater objective physical reality in which the universe exists. Epistemologically, a social constructivist framework assumes that "reality is co-constructed between the researcher and the researched and shaped by individual experiences" (Cresswell, 2013). Axiologically, individual values are honored, and are negotiated among individuals. In qualitative methodology, data is collected via interviews, observations, and analysis of texts and documents, among others. This data is understood inductively through consensus. Finally, qualitative studies tend to be written

up in a literary, narrative manner that helps draw the voices or experiences of participants through the study to the reader.

To address the fundamental research question of how and why a strength coach is trained and educated from a social constructivist interpretive framework this study used grounded theory as the primary approach. Again, major contributors to the grounded theory method include Glaser, Strauss and Corbin, and Charmaz. This study adhered to the primarily social constructivist position of Charmaz's grounded theory (Weed, 2009). Grounded theory emphasizes the importance of rooting, "grounding," analysis within the data itself through inductive means for "developing middle-range theories" (Charmaz, 2008, p. 397). Addressing this, Charmaz (2008) says that grounded theory refers "to both the research product [theory] and the analytical method of producing it" (p. 397). This method not only allows *what* and *how* questions to be addressed (as much qualitative research does) but rethinks ways to answer the *why* questions as well. It was, in part, the question of *why* strength coaches were educated in a certain way that drove this study. Similar to other qualitative methods, grounded theory begins with data collection (usually interviews), coding, memo writing, theoretical sampling, and theory development (Charmaz, 2006).

DATA COLLECTION PROCEDURE & PARTICIPANTS

Participants in this study were required to meet specific occupational status and institutional affiliation prior to being recruited for this study. Because of the researcher's working relationship with the group of strength and conditioning coaches that served as inspiration for this study, participation criteria were designed to include these particular coaches. To be included in the study and considered for recruitment, participants must

have been holding a full-time or part-time Division I strength coaching [or comparable title (e.g. "Athletic Performance Coach")] position in Central Texas. This criterion insured that this study addresses a specific group of Central Texas strength coaches in depth to develop a specific grounded theory. Inclusion of fitness professional or other individuals would have clouded the specific experiences of strength coaches of interest. Because of the focused nature of this study, not holding either a part- or full-time position as a strength coach (or analogous title) meant that these individuals were not recruited. Graduate assistants (GAs) and interns, for example, were excluded. As were non-collegiate and non-Division I coaches and former strength coach. If a participant suffered a health issue that impaired their ability to be interviewed or consent to an interview they would have been excluded from the study – though no participants met such criteria.

Following approval from the Institutional Review Board (IRB) strength and conditioning coaches at institutions of interest and who met the occupational inclusion criteria were recruited via email (including informed consent) (see appendix for recruitment email and informed consent). Thirty-eight strength coaches were emailed. Following initial emails, recruitment also took place via the phone (see appendix for phone script) and in person when possible. Email exchanges varied between zero (for those that did not respond) to up to eight arranging meeting times and with follow-up post-interview. To protect confidentiality, all possible participants were contacted directly rather than through their department's head coach or other staff member.

Generally speaking, collegiate strength coaches at the Division I level work with a variety of sports (Olympic sports strength coaches) or coaches can specialize in one of the large revenue-generating sports like football, basketball, or baseball. Because this study was trying to understand collegiate strength and conditioning coaches at such institutions, addressing all permutations of sport-responsibility was theoretically valuable.

From recruits that expressed interest in participating, a purposive sample representing a range of sport-responsibility and representative gender variations at these institutions was established. To examine the effect of the formation of the CSCCa and their SCCC and MSCCC certification in 2000, younger coaches ("post-CSCCa coaches") and older coaches ("pre-CSCCa coaches") were both selected. Selection attempted to have an equal number of pre- and post-CSCCa coaches across both genders. The rationale behind this decision was that "younger" coaches entered the profession in an environment of competing certifications (CSCS and SCCC) and far greater educational and credentialing resources available to them than the "older" coaches in the study. This environment could have driven post-CSCCa coaches to pursue higher levels of education or certification than the pre-CSCCa coaches who entered strength coaching before them. Participants' level of formal education (bachelor's degrees versus master's degree or higher) and type of professional certifications (CSCS and/or SCCC) were not explored prior to interviews.

Nineteen strength and conditioning coaches were selected for participation in this study, five of whom were women, a ratio roughly equal to the study population. Primarily composed of the multi-sport strength coaches, there was also at least one football-, one basketball-, and one baseball-specific coach. Nine coaches entered the profession post-CSCCa (the "younger" coaches) while 10 were entered the profession pre-CSCCa (the "older" coaches). The educational background of the participants, obtained from the interviews and available information on their employee web pages, is displayed below in Figure 3.1. This educational background reflects participants' education *at the time of the interview*. Progress towards an advanced degree and having previously held the CSCS credential (as was the case with one pre-CSCCa coach) were not reflected in the study.

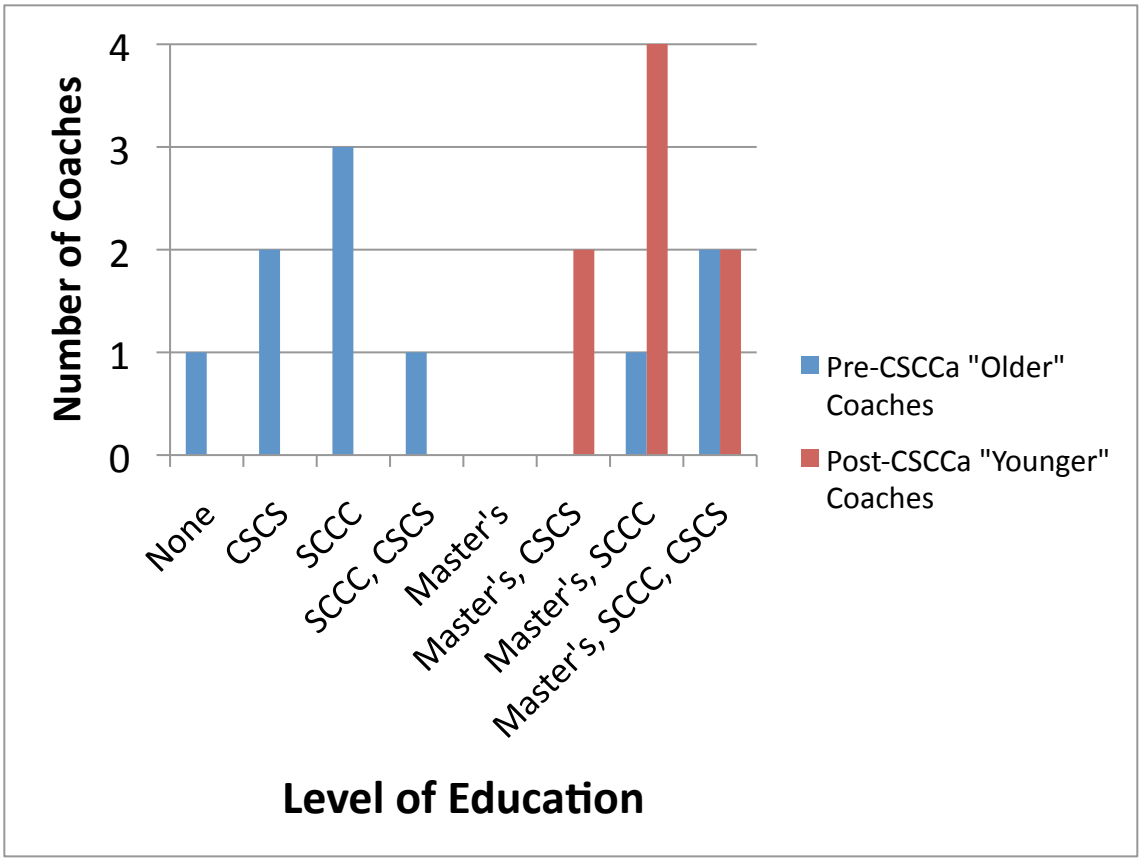

Figure 3.1: Participant Education Level

Implications of the varying education level and certifications of the participants are discussed in the results section, as is the proportion of pre- and post-CSCCa education for the women coaches in the study, as seen in Figure 3.2 below.

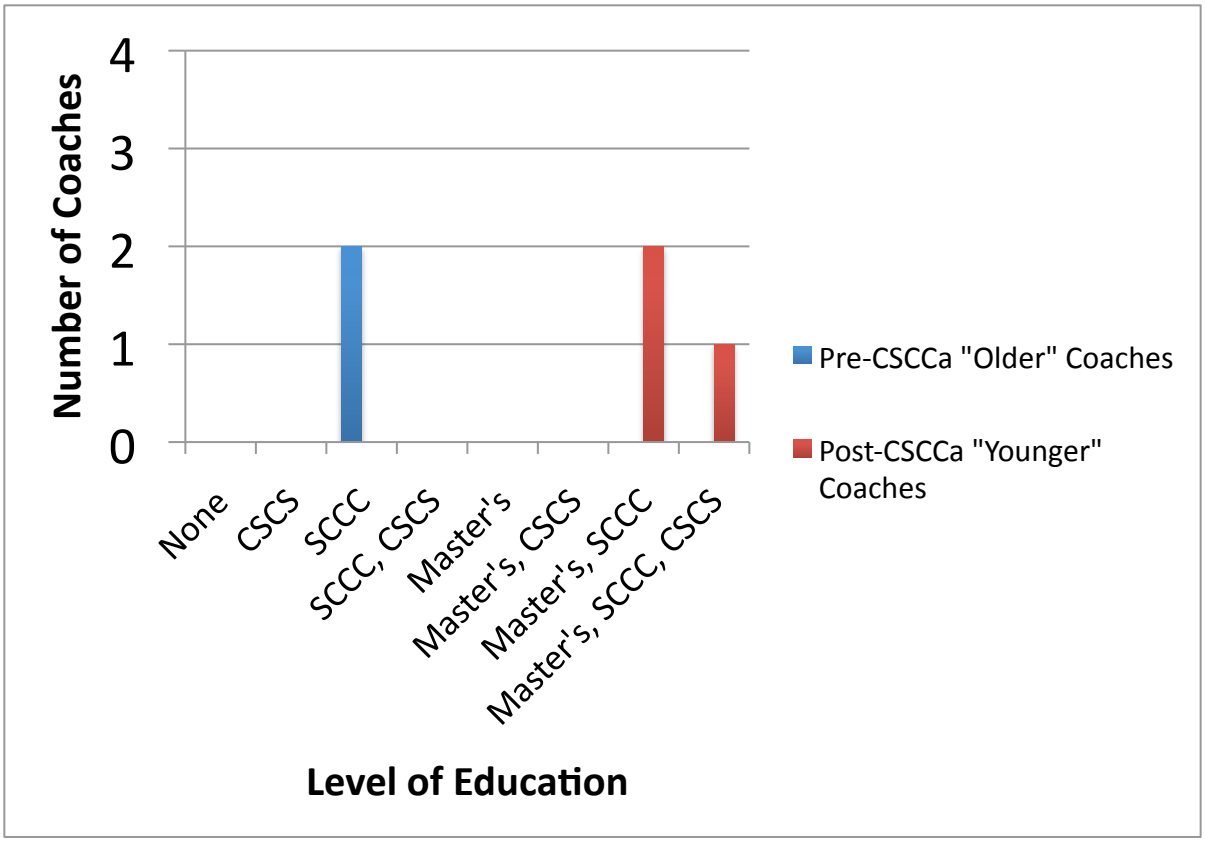

Figure 3.2: Women Participant Education Level

Consistent with grounded-theory studies (Charmaz, 2008), interviews were the method of gathering data for this study. A simple interview guide (see appendix) ensured basic demographic and occupational information was gathered at the beginning of the interview and functioned as an "icebreaker." From there, sections on "Professional Background" and "Training/Learning (Education)" were loosely adhered to. This loosely structured style is typical of grounded theory (Weed, 2009). While each question was addressed, the interviewer allowed the participant to primarily discuss what they felt is important in their educational background. The interview guide remained constant after each interview, but interviewer notes helped delve into developing and anticipating themes in each successive interview. All nineteen interviews were conducted over a 16-

day period (with several instances of three-four interviews daily). The frequency and volume of interviews created an immersive experience in which ideas about educational themes could be immediately tested in an interview a day or two later. Increasingly nuanced and appropriate prompts for the interviewer were developed in accordance with the iterative process associated with interviews typically later conducted from theoretical samples (Charmaz, 2000). As is the objective of theoretical sampling discussed by Charmaz (2009), this approach permitted the researcher "to refine ideas, [though] not to increase the size of the original sample." Given, this approach was far subtler than if full theoretical sampling was done that lead to subsequent second interviews with participants of theoretical interest.

All interviews were conducted by the researcher and recorded on two separate digital audio recorders in the event that one ran out of space or batteries mid-interview. Interviews were all conducted in private settings with just the interviewer and participant except in one case in which the participant asked if his Graduate Assistant (GA) could sit in on the conversation. Most interviews took place in coaches' offices though some interviews were conducted in separate private meeting rooms. Occasional athlete interruptions occurred in a few interviews during which time the audio recorder was paused. The majority of interviews (16) were conducted in person. Because of scheduling difficulties, three interviews were conducted over the phone. The researcher made the call in quiet private office to ensure participant privacy. All 19 participants said they would be available for a follow-up interview, either in person or over the phone, if needed.

Interviews were between a half hour and an hour and a half. The shortest interview was 25 minutes and 35 seconds; while the longest was one hour 40 minutes and

38 seconds. The use of the phone as an interview medium may have reduced data as two of those interviewed by phone only spoke for about a half hour.

DATA ANALYSIS PROCEDURE

After interviews were collected audio from both recorders were downloaded to the researcher's password-protected laptop (within the same day they were collected) and deleted from the recorders themselves. Back-up copies were stored on a password-protected Dropbox account. Recordings were labeled with the date of the interview (YEARMODY) followed by the interview number on that day (should there be multiple interviews). If the interview were the second interview on June 5th, for example, it would be labeled 20150605b. Audio recordings were later labeled with a pseudonym assigned to each participant to ease the locating of recordings for later reference. Pseudonyms were preserved through interview transcription, data analysis, and in this document. A key linking the participant pseudonyms to the coaches' real names was kept separate from the recordings and transcriptions in an ambiguously named electronic document. One year following completion of the study and submission of the thesis, the key will be destroyed by shredding (hard-copy) and electronic deletion (electronic copies).

Because of the professional visibility of the coaches in this study and the interest of participants in seeing the results herein, certain biographical details were presented as deliberately ambiguous while still maintaining the voice and experience of the coach. For example, if a coach first became interested in strength and conditioning through their experience in powerlifting, that background may be presented simply as experience in a "strength sport." Similarly, any descriptions of coaches will be ambiguous and the

coaches' age, number of years coaching, sport responsibilities, and professional titles will not be discussed outside of aggregate information.

Transcriptions were then made from the audio recordings by the researcher and kept in the same password-protected laptop and Dropbox account. Interviews were transcribed verbatim and the only information changed was if the participants' were said during the interview in which case the alias was substituted. Any quotes used from transcripts in any medium (e.g. thesis, presentation, article) do not contain the names of specific universities (unless there is no recognizable connection to the participant), other coaches, or specific sports that may identify the coach to those familiar with the study population. Gender, sports coached, full- or part-time status, and certification/education will be the only potentially identifying information discussed. Every effort has been made to ensure privacy is protected while doing justice to the narrative of each participant.

Transcribed interviews were then coded in two rounds – a process whereby, in the words of Charmaz (2006, p. 45), the "bones of the analysis" is built. Initial coding was done quickly and reflexively line-by-line to first make sense of the interview data. This act of coding takes a line or sentence of the participant and boils it down into a naturally apparent fundamental idea, action, or feeling. Specifically, the *in vivo* method of coding was used to allow the voices of the participants to be brought through the data by using their own words (or close to them) in these initial codes. According to Charmaz (2006), *in vivo* coding helps "preserve participants' meanings of their views and actions" as well as highlighting the "characteristic of social worlds and organizational settings" of strength coaches in this study. As in many fields, technical or cultural jargon is prevalent to and important in the strength coaching world.

Following the initial (*in vivo*) coding of each transcript the second phase of focused coding marked the first major analytical step in the data analysis process. As

described by Glaser (1978) these codes are more directed and conceptual than the initial impressions that drive the first phase of coding. These focused codes can pull the same language that drove the *in vivo* codes, but do not necessarily have to. Focused coding draws on "the most significant and/or frequent earlier codes to sift through large amounts of data" generated from grounded theory interviews. The transition between the two levels of coding is done without any large analytical jumps at this point in the data analysis. Table 3.1 on the following page demonstrates how initial and focused codes are pulled from transcription text to make meaning of the data.

Text	Initial coding (In Vivo)	Focused Coding
It made you use your head a little bit, you had to think a little bit, because not every athlete is going to get under the bar like a football player so you have to redefine what you're considering strength. So, if you're training a swimmer there are things that are more important for a swimmer than they are for a football player. You know they're pushing off the blocks and they are working against resistance the whole time, you know. How strong is their midsection? How fluid is their movement in the water? So, they're not very good on the ground when it comes to dynamics and a lot of other things so you have to be creative. Training a trackster versus an O-lineman is completely different, so every sport has what's important to that sport so you just have to figure out what the most important attribute it. Football it's not just power and strength and close quarter combat and all that stuff but it is really, you know, um, injury prevention, minimizing the injury window, just non-contact injuries, making sure that window of injury is small.	Not every athlete like FB More important for swimmers Swimmer not good on the ground O-Lineman different from trackster Figure out most important attribute of sport Strength, CQC, Minimizing injury window	Sport mentality Sport-specific demands Determining training goals Sport-specific demands Recognizing injury prevention

Table 3.1: Initial (In Vivo) and Focused Coding

Following these two phases of coding the researcher then began the process of memo-writing. Charmaz (2006, p. 72) says that "memo-writing is the pivotal intermediate step between data collection and writing drafts of papers" and that it is especially crucial for ground theory methodology because it "prompts you to analyze your data and codes early in the research process." As Weed (2009, p. 505) describes memo-writing, "allows emergent ideas, notions and linkages to be formally noted and

included in the iterative analytical process" or, more simply it serves to "move from codes (description) to concepts" (p. 506).

Memos were generated following coding of the data as a way for the researcher to work through the questions and themes emerging in the study. The writing-style of these memos follows a "stream of consciousness" format as the researcher attempts to tie together the experiences and recollections of the participants. Table 3.2 below explores the idea of learning to like strength training. This theme in the study is explored in the memo below with the variations seen for these two participants (pseudonyms used).

The early love of weight training seems really critical for a lot of these coaches. This desire to get stronger and to do so deliberately. Through this measured and measurable work. Two coaches speak to these early experiences with beginning to love strength training outside of sport or even a weight room. These seem to serve as an early cementing of a love of strength and of lifting. Of deliberately trying to make muscles stronger and improve conditioning, not simply to do physical work. Everett tells me about how learning mechanics of good whole-body lifting from watching his day work on his land – lifting bales and moving rock. I remember a coach I worked with back home talking about the same thing, "the hay bale clean & push-press." Does this love of strength from outside the weight room, while still training it deliberately, matter for Everett's development? Did it make him different than other coaches? Does it today? Shane had similar stories, of being outside all the time as a kid. He learned to lift from his dad on equipment his dad built from old combine parts welded together and I keep rethinking Shane's comment about that being "still the best lat pull-down I've ever used." Later comments from both guys link their love of lifting to the gym, but I keep coming back to these examples of more humble forms of lifting.

Table 3.2: Sample Memo on Learning to Like Strength Training

As the themes and ideas in the codes began to take shape through conceptualizing them in memo-writing, these crystallizing themes were constantly referred back to the original data to be tested and compared – to make sure they matched what the coaches

were saying. As the concepts generated were grounded in the data, the researcher was able to always trace themes back through the focused and initial codes of many participants to check the theme at each level of analysis.

As the ideas generated in memo-writing stood up to the anvil and hammer of comparison and looking back to the data, they began to develop the categories upon which theory was built. Because of this reference back to the original data, the theory became very much tied to the population of participants. Unlike a quantitative survey that seeks to generalize, a grounded theory seeks to explain the experience of just those participants in the study.

DELIMITATIONS

This study was limited in the participants the researcher chose to include, the questions it asked them, and the literature that informs and supports it. While questions of interest in this study include those that address the development of professions as expressed through the training of its members, literature on learning professional skills and receiving technical education was excluded. While there is much literature on education and training of sport coaches, including at the elite collegiate level, this literature was also not considered. The same is true for literature on sports medicine specialists such as athletic trainers. Collegiate strength coaches fall in their own niche somewhere between the coaching position of the sport coach and the support role of the athletic trainer. For that reason, literature was strictly limited to that which focuses on collegiate strength and conditioning coaches.

Collegiate strength and conditioning interns and graduate assistants (GAs) were excluded from the study as well and, so, while the findings may be helpful to those

immersed in the educational process, it is not generalizable to the current experiences of GAs and interns. While participants recalled the learning experiences of being an intern or GA, they were speaking from their position of individuals who made it in the field and at a very high level – an opportunity few interns, GAs, and even other strength coaches will have available to them. Similarly, coaches outside of Central Texas at the Division I level were excluded, as were the Division II and Division III strength coaches. Beyond collegiate athletics, strength coaches in professional sports and at private facilities, as well as all other fitness professionals and personal trainers were not included. While these individuals have many of the same skills and technical proficiencies of a collegiate strength coach, they often operate in very different setting and may have come to coaching through different pathways than those strength coaches of interest.

Of the participating coaches, interviews and analysis focused on the educational and training experiences of the coach and not other aspects of their professional lives. It was what the coach learned and used from their time as an athlete, for example, that was of interest, not the experience of the participants as former athletes. The focus on education limited the study and left unexplored several aspects of strength coaching to keep the study manageable and to increase analytical precision.

Once such aspect of coaching was the way in which the participants coached their athletes. While most participants spoke about how they coached, questions were directed to how the coach formulated their stance on athlete development, rather than dwelling on the specific mechanics of those interactions and that relationship. This delimitation extended to why participants coached as a career. While most coaches revealed the reasons that they got into strength coaching, the personal decision to pursue strength coaching over sport coaching, for example, was not explored.

In addition to not exploring coaching mechanics, the more technical side of strength coaching was left out of this study. How the participants learned to program workouts and correctly perform and coach exercises was of high interest, but their specific methods of exercise assignment and workout design were not explored in depth.

Finally, while this study sought to understand and describe the training and education of collegiate strength coaches, it did not aim to rank the educational quality of the participants in the study. The purpose of Figure 3.1: Participant Education Level, for example, served to describe the population, not to assign value to the qualifications of the participants. Building off of this idea, the study also did not seek to determine if some coaches were better coaches than others in the study or coaches not included in the study. The population of interest assumes that these coaches represent some standard of ability touted in the field (and by the NSCA and CSCCa) as an example of adequate professional preparation.

ETHICAL ISSUES

Given that interviews were not invasive and the participants were professionals no major ethical issues or potential for the data collection or results of this study to do harm was anticipated. No physical or psychological risks were expected by participation in the study. An educational or other event of career significance may have been recalled that was emotional or traumatic for a participant (e.g. an injury ending their athletic career), but no harm was anticipated even in this case. Participant anonymity helped reduce any concerns participants have about voicing opposing opinions to the educational directives from the NSCA and CSCCa, NCAA, or the university with which they are employed. While every effort was made to insure confidentiality, there may have been a potential to

identify participants from their unique background. If a coach mentions their background as a polevaulter at Rice University (fictional example) in the interview, any publication (e.g. thesis, article, presentation) of that quote would simply identify them as an "individual sport athlete" at their "undergraduate institution.

Chapter 4 – Results

The constructivist grounded theory model produced a large amount of data (nearly 18 hours of interviews from 19 participants) to analyze. In keeping with the method and the type of data produced, this section will present interview excerpts that spoke particularly well to a given subject discussed by participants. Again, participants were all full- or part-time collegiate strength and conditioning coaches at Division I university athletic programs in Central Texas at the time of this study. They were Olympic sport strength coaches or were specialized single-sport coaches in football, basketball, or baseball. Of the 19 coaches 14 were men and 5 were women. They ranged in age from 26 to 59 years old, all with varying experience in the field of collegiate strength and conditioning coaching. As discussed in the methods section, participants were clustered into two group based on when they received their professional training. Those that were graduate assistants, attended school, and entered the profession before the CSCCa was founded in 2000 are classified as "pre-CSCCa" coaches. The younger coaches, those that entered the profession after 2000, are classified as "post-CSCCa" coaches.

The results will be presented as themes that emerged in the data followed by overall theories of how these coaches became educated as strength and conditioning coaches. Care has been taken to present all information objectively and let the data speak for itself. Inferences about the data and comparisons to the literature will be made in the Discussion section that follows.

HOW IS A COLLEGIATE STRENGTH AND CONDITIONING COACH EDUCATED?

At the time that interviews were collected in June and July 2015, Division I strength and conditioning coaches did not yet need certification as per NCAA regulations (NCAA DI Conduct, 2014). Despite the lack of educational requirements by the NCAA, strength coaches have pursued certification and education specific to their profession for decades (Martinez, 2004). Educational and certification requirements vary by institution, but a bachelor's degree was common among all participants and all but one coach had the CSCS and/or SCCC certification. The CSCCa, the certifying agency specific to collegiate strength coaches, requires that coaches have at least a bachelor's degree (as does the NSCA) and encourage them to pursue a master's degree in addition to, of course, getting their SCCC certification (CSCCa Bachelor's Degree, 2015). As the coaches in this study comprise some of the top strength and conditioning programs in the southwestern United States, their training is very likely to be at or above the level expected by not only the NSCA and CSCCa, but by their peers in the field as well.

The following sections address this question of how the collegiate strength and conditioning coaches in this study were educated focusing around several themes that emerged in the data. First the learning from the personal experience of working out and the need to continue to stay strong and fit will be presented. Then experience of being an athlete and being coached will follow. Next the education coaches gained from time spent as a strength and conditioning coach is presented both from the perspective of participants as young interns or GAs as well as how they operated at the time of the study. The following section also presents learning from time spent as a coach, but the emphasis is on learning to coach the "person before the player," as one participant said. The experience of being mentored by a strength and conditioning coach follows. Finally,

two sections addressing more formal educational situations are presented. The first is the participants experience with classroom work and how that translated to the weight room. Second (and lastly) is the role of self-education in the development of the participating strength coaches.

THE EXPERIENCE OF TRAINING

Participants were first asked to recall their initial experience with lifting weights and training. For many, this occurred as an athlete. Others pursued strength on their own, guided by magazines, books, or their peers. Early experiences with weight training were formative in coaches' passion for strength training as well as establishing their understanding of the body. Knowing how training felt as athletes and feels now in their current routines helps ground the conditioning philosophies of these strength coaches.

For many coaches, their first experiences were used to develop their sport abilities. Many men had this exposure in high school through strength and power sports like football and track and field. Many women, like Jill, were not exposed to strength and conditioning programs until they entered college. Jill attended a "really small school" with a National Association of Intercollegiate Athletics (NAIA) athletics program. A team-sport athlete, Jill had to look beyond the strength and conditioning opportunities offered to her women's team to learn about lifting:

> We didn't have a [women's] strength and conditioning program. The men's [sport] program hired this guy that did powerlifting so I jumped in with them for an off-season and went from like 145lb to 170lb and literally in a semester. I was super immobile. I was strong as crap but it didn't transfer that well to the [game].

Like Jill, Lorene and Andrea did not lift weights or deliberately train outside of their sport since college. Lorene was trained in the weight room for her team sport and Deanna was also trained in the weight room for her individual sport. Even though Andrea was a student many years before Jill, since she played her team sport at a big university, she had the opportunity to train in the weight room. For Andrea, her desire first learn about weight training developed through television well before she had the opportunity to train as a college athlete:

> I've always been fascinated with muscles ever since Lou Ferrigno hit the screen as the Incredible Hulk in the '70s or early '80s, something like that, and for whatever reason I just figured that is what I want to do. I want to look like that. Not green, but I want, muscle really caught my eye, to this whole 'how do I get to look like that?' So, being a high school athlete as a woman in Texas we didn't really do the weight room thing very much… I was a college athlete… and we were on our regimented weight program and I just fell in love. I just threw myself into the weight room. The weight room is the place that I excelled at.

Many of the male coaches had lifted in high school and some had even early experiences with strength and training. For Everett, his initial strength training came from the manual work of his father. A ranch hand, Everett's father took to work and exposed him to manual labor at an early age,

> There's pictures of me being on the back of a horse with him and I'm so small my legs were straight out, parallel to the ground in some sense. So I like to say that I had a horse before I had a bicycle.

Everett's close relationship with his father as a child was clearly foundational in his thinking about physical training today. Speaking of the kind of strength developed by working with one's hands, Everett says:

> We just worked. Things that we did for fun was work. So, when you're working cattle, for example, it's a job. It's a chore, but you make it fun… so as a young boy your challenge is to grab a calf, flank it (that's picking it up and throwing in on the ground) by yourself. And you're basically just going head-to-head with this animal that weighs more than you technically… it was just that manner of manual strength. So that, you know, cowboy strength, farm boy strength, whatever you want to call it, that's where you start learning that I got to learn how to use my body efficiently… There's that level of strength that you create around just learning how to work. And you can take people who are manual laborers and they can outwork the strongest guy.

Everett's early exposure to learning about strength development and application was echoed in many ways by Shane, whose father (a cyclist) and uncle (a Division I athlete) trained on their farm. Shane spoke fondly of this early experience learning how to lift in the lean-to on their property and of the equipment built by his father and uncle:

> I started lifting when I was in third grade. So, living on a farm, my dad and uncles built all of our weight equipment. They built the leg press, they used pieces off of old combines… They made a bench, they had a lat pull-down where they used a field disc and they welded a pipe on top of it and hooked a chain from the inside of the combine and ran it up over the top of the cage. And that's still the best lat pulldown machine I've ever used because it's like constant tension. It's sweet... So, when he would train, I would always go lift with him and he'd let me play around with the machines. I remember I hated upper body as a child; I loved doing legs.

Lloyd, like Everett and Shane, was also first introduced to lifting because of his father through a gym owner he met in town named Hank (pseudonym). Lloyd would train with Hank two or three times a week during high school to get stronger for his sport. He also began taking amino acids during high school under Hank's direction. Lloyd took what Hank had taught him and would lift weights before school started:

> The bus route I was on dropped me off 45 minutes before the bell rang. So… I just walked down the hallway and football had a weight room that was

> unoccupied in the mornings. And the lights were off in there but I would just go in there and train. With the lights, there was this one overhead light that was a floodlight that was on over the dip bar. And I'd go in and train that 40, 45 minutes before class and nobody knew I was down there doing it all by myself. And I would train and then I would go see Hank and I just kept getting stronger and getting into it more and I just kind of caught the bug I guess, you know, and that's how I got into it.

Lloyd's motivation for training was largely to get bigger and stronger for his sport. For other coaches, like Doug, the purpose of training was initially more cosmetic than sport-specific. Unlike the other strength coaches in the study, Doug was a self-described "non-athlete in the conventional sense in high school." His athleticism was expressed through extreme sports. Doug says, "I wanted to gain weight so I started to look into lifting weights around my junior year of high school. And, um, started really getting into going to old school education." That "old-school" education came from the bodybuilding literature of the day:

> My first book was Bill Pearl called "Getting Stronger" I mean an old, old book. I read all the Arnold whole "Education of a Bodybuilder" so, just, Arnold's Encyclopedia [of Modern Bodybuilding]. Started getting into nutrition so I have this log, this little spiral log, back from 1991 with all my pictures of me in high school with my shirt off, all skinny, and every meal every day. I mean calories, fat, protein, I was really meticulous early on. Same with training, I just got a passion for it. I went [up] from 165lb out of high school. Gaining weight and started to get stronger.

In college, many coaches were training regularly for their sport like Neil, Lloyd, Lyle, Deanna, Fred, and Allan, among others. Unlike their later time as graduate assistants (GAs), the knowledge gained from time training in college was experiential and kinesthetic. The knowledge of what it feels like to train when fatigued from practice, tired from late nights studying, coping with the stresses of early adulthood, and managing

injury. When asked if he learned anything about how his strength coaches developed their training plans, Everett spoke about his thought process (reflecting on his knowledge of training today) during hard training sessions:

> Your training is so hard outside and then you're going right into the weight room. Or coming from the weight room right into practice. So they were real close to each other. So that was a different, the energy system that was being demanded on, that, that was really hard to deal with it. You just basically, I didn't think about philosophy of why I was training this way, I just knew this is what they're grading me on, this is what they're watching me versus this kid, I have got to the best at all of these things I do and I have got to be strong.

College experiences of training, like Everett shares, provided that personal education and the ability to empathize with the athletes they coach today. The embodied memory of training is important not only for being able to relate to the athletes but current and regular training is perhaps even more important. Regular training allows coaches to understand how programs will feel when the athletes run through them. Deanna said several times how she would go through every workout she would give to her athletes to learn how her body felt after the workout and to figure out the optimal order of exercises. For Lorene, the need to train regularly reflects her educational philosophy:

> I learn by doing, I learn by seeing… I'm not going to do anything with athletes before I have done it myself. I don't do a program, I don't do a movement. It's just learning and teaching philosophy. That's just my philosophy.

Staying strong and fit through regular training is necessary to maintain credibility with the players. Andrea spoke to this very specifically, as did Michelle. Both coaches saying that being able to physically demonstrate exercises with respectable weight or ease

was necessary (generally and as women in the field). Being able to best their athletes in certain movements is a way to establish credibility through that physical act. Speaking on this idea, Michelle said:

> For me, I know what it's like to train hard. I know what it's like to work hard. I do my workouts before any of my athletes ever do them. I'm physically capable of anything that they do as far as on the strength and conditioning standpoint.

Nearly all coaches expressed the need to be currently physically fit and strong in their interviews. Doug likens the need to lift weights as a strength coach with the "never trust a skinny cook" adage. For him the presence of that physicality is more important than proficiency in the technical knowledge and skills of strength coaching. Especially as a single-sport coach, it's important for him that his players see him train and recover from injury. On both these areas, Doug says:

> To be good at something you have to be capable and real about it. And if I'm going to be a strength coach, I better be a strength coach through and through. So, there are a lot of strength coaches who know a lot about technology, which is great, there a lot of them who know a lot about technique. Or their athletes put to work… I've got four big surgeries, both knees, both shoulders, but it's all been in the context of my players seeing injuries happen and my players watching me come back from it. And that helps my credibility with them.

What type of training coaches were engaged in was perceived as largely unimportant for maintaining credibility with athletes, peers, and themselves. As coaches who are not competing do not have a specific set of physical qualities to develop, training tended to vary from job-to-job, depending on which team they were focusing on, or if they were trying to learn a new type of programming. Lorene used herself as a test subject when trying out a type of advanced strength and conditioning programming.

Andrea spoke about the same experience. Erik was asked how his training has developed as he has moved from an athlete to a GA to a coach and through the universities he has worked in. He highlights the variation experienced in personal exercise programs:

> I'm all over the map. And it's really bad. But depending on where I've been it's a different emphasis. As an athlete I didn't even know what I was doing. I was just working as hard as I could because I thought that was right. And then I got into more, like, endurance running and I would do 10Ks, 5Ks, and everything was all about that. Then I kind of shifted back into the weight room and at [my graduate institution] that was a blue-collar type of environment there and it was all, back to like, 'oh, I'm just going to work harder than everybody else'… And now that I'm here I typically train with the [team] that I'm coaching. So, we have different groups in here. Whether they're just different levels. An introductory level to a more hypertrophy level. To a strength and power to more specializing in whatever group I am coaching. I tailor my personal training to whatever I'm coaching and it's really helped me No. 1 know what the athletes are feeling and No. 2 it makes me a better coach because I'm actively doing it and thinking about it.

THE EXPERIENCE OF BEING AN ATHLETE

Beyond the introduction to weight training through sport participation, playing a sport itself was talked about as a valuable experience for the participants in the study. Whether at the elite college or even professional level, in the case of Everett and Allan, or just in a small college or in high school, being an athlete taught coaches, through modeling, how to run practices, coach players, and lead a team.

Having recently graduated from college, and retiring from sports, Neil was the de facto strength and conditioning coach when he went on to coach his team sport. At the time Neil said that "being the youngest guy on staff and the one who just finished playing and having most recently been in a strength program, that kind of fell off in my basket of

things to do." For Neil, the experience of being an athlete gave him his first entry into the world of strength coaching.

Like experience with weight training helping coaches develop credibility with and empathy for their players, the experience of being an athlete provided valuable understanding of what an athlete hears when being coached. Speaking about what he contributed to his GA cohort, Allan said:

> Me, I was talking from the know. I was talking from the inside out. I'd been a professional athlete. I was talking to some of the things there were telling their athletes and how it translates for them. So, when you're talking to an athlete, what are they hearing versus what you are saying. And what's important to them… Just because there's weights in the building doesn't mean it's important to them.

Shane echoed a similar feeling of knowing how an athlete thinks and feels now that he is a strength coach for the individual sport he played in college. Other coaches connected their competitive years to their current coaching from learning to recover from injuries and how the strength and conditioning was a critical component of that process. As mentioned before, Doug had several major surgeries from his career as a nationally qualifying strength athlete. The surgeries he had while competing were learning opportunities he drew on when recovering from future surgeries as a coach. Like Doug, Ben sustained injuries in sports during his childhood. A lot of Ben's initial interest in strength and conditioning during college came from wanting to learn how his injuries happened:

> I always wanted to understand what happened. Where did I go wrong? How did I get the injuries that I had? The main injury I had was from flag football as a kid. It was just full-blown football with flags and not much attention [to safety]. That's how I tore my rotator cuff, twice.

While playing experience in any form was cited as a positive source of learning about how to be a good coach, how to work with athletes, and what it felt like to play, not all playing experiences were viewed equally during a coaches' professional career. Michelle was a club-level team-sport athlete as an undergraduate. Asked if she felt experience as a club sport athlete, instead of an NCAA athlete, could be a challenge professionally when starting out, Michelle said:

> I think there's probably a little bit of bias towards hiring strength coaches that have been collegiate athletes through, you know, NCAA collegiate athletes. There's probably a fair amount of bias one because you usually get positions through recommendations in this field and a lot of recommendations come from coaches that had someone as an athlete and can, you know, vouch for their character… And then, you know, other people would say that you don't know what it's like to go through what these athletes are going through because you yourself weren't a collegiate athlete. Both of those things I think can be worked past but I think that there are definitely obstacles…. I think people probably prefer college athletes. Not, not necessary, but prefer. And I think it helped me because I was kind of the underdog that had to work a little bit hard. And because I wasn't a collegiate athlete I had to physically and mentally push myself even harder because I feel like I had ground to make up.

TIME IN THE FIELD; TIME ON THE FLOOR

Time in the field, the accumulation of experience, was cited again and again as a major source of learning how to perform the tasks necessary as a strength coach. This quality took different forms, from viewing this experience as a simply "daily grind" of repeated tasks day in and day out on the weight room floor to the demands to adapt to new and changing work environments. This is the category of experiencing strength coaching compared with the experience of training or being an athlete.

At the early stages of the coaches' professional development (as GAs or interns), the experience of spending time on the weight room floor was a time of busyness and

excitement punctuated with moments of uncertainty. Thinking back to her first day, Michelle describes the experience of interacting with the weight room environment and coaching culture as it related in particular to her being a woman:

> Ok, so, I was nineteen-year-old and I was a female in and environment of about two hundred males. Looking back you're just like "how on earth did I make it?" I just have to have really tough skin. My first day I remember very specifically I was supposed to get there at 5:30. And, so I'm always on time, early on time. And I got there at 5:15 and the workout was already rolling, I mean there was an entire football team in there. And, so, I had, I mean I thought I was getting there well prepared, but it was already going. So you have this moment of kind of awkwardness and panic and re-checking to make sure there you were where you were supposed to be when you were supposed to be there. And I mean, honestly, I was nervous as heck, I didn't know what to do. I had been given no instruction. I stood in the corner and watched this workout happen and I remember at the end of it the strength and conditioning coach came up to me and said "this is the last day you'll ever stand in the corner and this is the last day you're ever going to think of yourself as a female." And, he said "you're a strength and conditioning coach. It doesn't matter if you're a male or a female and you're always confident and you're always gonna coach to the best of your ability." And so I think that it was trial by fire, one hundred percent. There were days that I loved going, and days that I hated going. You know, kinda one of those things, but I knew that it was what I wanted to do and I knew that there were necessary means to, you know, making me kind of progress as a person and develop out of this nineteen-year-old female mindset. And be able to kind of handle a football environment…

Michelle is highlighting a common experience among the coaches interviewed who worked in a foreign and established weight room culture. In particular, her discussion of having days where she wanted to quit, those hard days, is considered critical experience and learning in the field. Outside of this intense initial coaching environment, the strength had other learning opportunities that were, as Michelle said, very much "trial by fire."

Neil was a team-sport athlete who became a sport coach at a junior college in the same sport he played. There he fell into the role of strength coach simply because he had

the most recent playing, and therefore strength and conditioning, experience. At that time, the junior college where was coaching did not have anyone acting as a strength for his team. Through his time acting as a strength coach while being a sport coach, Neil learned how to enact the type of programs he wanted even when moving to a Division I school that restricted his strength and conditioning involvement with the players:

> So I spent four years…. as an assistant basketball coach just because that was part of my job description, was strength and conditioning. I went to [my second] University where I was an assistant coach again. And at the time they only had one head strength coach for everybody. And he obviously was most concerned with football so, while I was there, I didn't like the way, what he did, with [my sport]. I started using the GA he had to train our team. And then I kind of oversaw him without overseeing him because at JUCO you can do whatever you want. But at Division I, I can't have those cross-responsibilities. We used the GA and the GA ended up going to the [NFL] in a full-time position when he finished.

Jill learned how to be a strength coach through her own need to fill the unfilled void of strength coach. As her team did not have a strength program, she trained with the men's team and became really interested in strength and conditioning. On a friend's recommendation, she applied for an intern position that following summer. With the knowledge she gained, she gathered basic equipment and became her team's de facto strength coach.

Neil's and Jill's experiences of filling in where a professional need was not being met happened to Ben as well. The small Division I university where Ben did his graduate assistantship was extremely short-staffed in the strength and conditioning department as well as in sports medicine. The athletic trainers turned over about every year. His experience of working with many teams in this professional environment was beneficial for learning how to manage a lot of teams, but had its drawbacks as well:

> I walked into that situation and… I assisted with football, I had baseball, I had track and field, I had Nordic skiing, I had women's golf… I had all those and then I would also help out with any other sports that needed help so if it was alpine skiing if it was softball if I was soccer, volleyball, I also helped out with those three coaches that had those sports. Now granted I wasn't writing the programming for those sports but again it's just adding to the amount of stuff I had to do that detracts from what I need to do for the teams that I had.

Ben's experience provided him with time- and resource-management skills, but at the cost of quality. Louis had a very similar experience as a GA as well. Since GAs are usually assigned the smaller, sometimes poorly-known, nonrevenue sports, the coaching process usually entails a lot of learning both about the sport and the kind of athletes that play it. Speaking to the same challenge of developing a workout program for a new sport with very limited time resources, Louis says:

> It was a combination of talking to the head sports coach in terms of physical needs of those new sports. Relied quite a bit on the basic "Essentials of Strength and Conditioning" at that time, which I think was probably the, was, part of that current but limited literature at that time. A lot of it was trial and error, you know? And in constant communication with the sports coach, the head strength coach. Seeing what worked, seeing what didn't work. It was, you were stretched. We were extremely stretched. So sometimes we duplicated workouts among the sports. Kept it basic, you know. Upper body strength, lower body strength, core strength, hip mobility, general flexibility. We were very general in our programming early on because of the large number of teams. It wasn't practical to program for that many sports individually. It just wasn't practical, yeah. So took a very general approach to strength and conditioning. Squatted quite a few teams. We bench pressed quite a few teams. In retrospect I probably would have done it differently now but at that time that's the way we chose to handle it, by keeping it general.

Louis' process of learning how to build programs by talking with sport coaches, self-experimentation, and talking with peers (in time-limited conditions or not) is shared with many coaches in the study, especially the pre-CSCCa coaches who did not enter

strength coaching with the wide and varied resources of the internet. These specific programming strategies are expanded on in later subsections.

An educational benefit gained from having spent time in the weight room coaching is an understanding of what an athlete does and does not need in a conditioning program. Though the role of scientific knowledge is beneficial, time with athletes yields certain insight and provides valuable training to the coach. When trying to figure out how to train the new team he was assigned as an assistant coach, Erik said he talks with other coaches:

> Yes, but I am of the philosophy that we specialize too much. Sometimes we incorporate too much sports-specific things into my training. Is that potentially harming me more than it's helping me? Because I think that, even at the Division I level, certain athletes lack foundation skills. The ability to control their body in space, the ability to decelerate, the ability to squat safely. So, at what point is becoming super sports specific helping them or hurting them? But, certainly I call different people… What I first got [a new individual sport] I called my friend at [my former university] who had done it. Coach [Smith]… he's their director. He had just recently taken on [the sport]. Been in game for like 30 years, talked to him. So, yes, you know. We had a consult come to campus and I spent four days with him. I'm a nerd, I'm going to use all resources that I can.

Similar to the learning process Erik discussed of talking to coaches paired with an understanding of players to optimize routines Allan outlined the importance of understanding how that programming knowledge transfers to on-the-floor coaching. In terms of understanding the difference between athletes, Allan says:

> It made you use your head a little bit, you had to think a little bit, because not every athlete is going to get under the bar like a football player so you have to redefine what you're considering strength. So, if you're training a swimmer there are things that are more important for a swimmer than they are for a football player. You know they're pushing off the blocks and they are working against resistance the whole time, you know. How strong is their midsection? How fluid is their movement in the water? So, they're not very good on the ground when it

> comes to dynamics and a lot of other things so you have to be creative. Training a trackster versus an O-lineman is completely different, so every sport has what's important to that sport so you just have to figure out what the most important attribute it. Football it's not just power and strength and close quarter combat and all that stuff but it is really, you know, um, injury prevention, minimizing the injury window, just non-contact injuries, making sure that window of injury is small.

LEARNING TO COACH ATHLETES AS PEOPLE

Experience playing, lifting, and coaching all provided a valuable foundation for the coaches that taught them how workouts feel and help them empathize with, and get comfortable around, their athletes. Besides just experiencing coaching, another theme that developed in interviews with the coaches was learning how to coach the athlete as a person. When discussing this, coaches spoke in a more reflective rather than experience-driven way. Rather than a "time in the trenches" approach to this aspect of development, it was one of understanding and empathy. Whether from interaction with one of their athletes or the memory of something their coach taught them, learning to coach people first and players second was highly important.

Everett pointed to his experience being coached as a primary source of how he shaped himself as a coach in terms of interactions with his athletes. Of his former assistant sport coach he says:

> If I ever become a coach this is the guy I want to be like. If I can emulate to any degree what he has, if I can get the respect of an athlete (and I thought about this later in life as I'm becoming a coach) that I had for him and that other athletes that I saw and guys that came before me had for him, I'm gonna be ok. And I knew then and there it wasn't about how much books I knew, it was more than that, but I needed to know the basics, I needed to know something and be really solid with the basics. And you had to believe in him. It wasn't that he could do what he was telling us to do, it didn't matter, cause he'd already been through some shit, and that was enough to validate him, right? You've got to be validated.

> And he validated himself when he wouldn't talk about his military history too much, … But, he just, you were validated, so you just did [what he asked].

Becoming this kind of coach, one that holds the respect the way that Everett's coach held his, the kind of coach focused on not only player development but also personal development, was echoed throughout the majority of interviews. As Lloyd says, coaching must be "a calling" and not just a job. On the ability to impact student-athletes through his "calling" Doug says:

> I think strength and conditioning is a really blessed profession. I think coaching is one of the most important professions out there—outside of teachers and being a parent. And a strength coach is a really special role as well… I've said it forever, but my ideal package is strength and conditioning. There is no other profession I want to do, and I don't think there is no other profession I could do. I think I was called to this. I didn't necessarily choose it, I kind of got steered this direction. You know, young people just choose it cause it sounds cool but they have no idea what it takes. And what it takes is your whole life, your whole soul, and your whole person. In my mind.

Doug's powerful description of what it is like to be a coach demonstrates the learning that has taken place for him in developing this relationship with his profession and his athletes at this later stage in his career. In contrast, Michelle talks about early experiences developing rapport with athletes as well as managing behavioral problems. If athletes are acting up and they were disrespecting her, she says:

> It's like the child running the show rather than the parent. You can't let their moods dictate how you coach. And so I'm positive that, like I said, they were probably thinking why on earth would I listen to this young female who's still in college, but once you kind of prove yourself and once you operate with a certain amount of self-respect then I think people respond to that. Then I think, unfortunate in the south, people were kind of told to respect females in general and most people were raised that way. And so I think I probably got a little more respect that way as well.

Learning how to deal with behavioral management that can be necessary with immature athletes is a skill most coaches said they learned while a GA or intern. When an emotional or rambunctious athlete disregards the instructions of the strength coach, it requires some form of discipline be enacted. Fred explained this need to discipline athletes and hold them accountable following his transition from intern to part-time coach at his current institution. Michelle talked about a similar need to step in and take care of behavior that occurred more dramatically:

> I remember a specific time that an athlete was supposed to be in the weight room at a certain point and he was late for his workout and… he was in my group that I was kind of responsible for. And so I reported him as being late to the head strength coach. And when [the player] came in he cussed me out. And I remember that was definitely hurtful but I also remember the after effect of a lot of people having my back in that situation. And so it was a skin-thickening experience... You know kind of like you're always the coach and they're always the athlete no matter what, no matter how… I think that you stay consistent, and you expect the athlete to be inconsistent. And, I think that that was definitely very crucial in my development and, also, the fact that that there were a lot of people, not only the athletes, but the coaches, that had my back in that situation, and that I didn't even necessarily have to respond. Like, they almost stepped in and responded for me. And so I think it was just kind of a lesson in humanity a little bit.

Of all the participating strength coaches, Allan spoke most often and most thoughtfully about the need to coach the athlete as a person. A major reason behind this was his surprising statement that he "doesn't like coaches at all" because he says "I think they miss the point. That they have an opportunity to impact young people's lives and they get, they get sidetracked." When many coaches may get sidetracked with technique or technology, as Doug mentioned earlier, they can also become sidetracked from coaching athletes as people in their continuing education. Allan, in contrast, focused his

continuing education on reading that improved his understanding of athlete behavior and or athletes as people:

> I'm not going to say I'm an avid reader but it's important to pick up different material and read it. I think the things I might not read, I'm not a big traditional strength and conditioning reader, you know. I take a look at some of the Russian manuals and stuff but that's not what you're going to catch me reading. I read a lot more personal development, mental development… It makes me think about the person before I think about the athlete. Because nobody cares about, if you put the athlete before the person you're going to have a messed-up individual. That's what it makes me do.

Like Doug and Lloyd, Allan's passion for developing young people really comes through in how he talks to his athletes and what the value of a strength and conditioning coaches is in their lives:

> I think a lot of people forget you're young and when you're interacting with somebody it's how they make you feel. You get into a sport and that coach when you're young he either makes you believe you can do certain things or that you have a certain potential and you like the feeling that the guy helped you recognize. Alright, and then so you say ok, that's good for me. And you're looking for that kind of confirmation from other male figures and for female maybe from other female figures. And you're looking for the father-son relationship and that kind of stuff. And then once you kind of identify that emotion and you recognize it, I mean, you gravitate towards it. We all want to help somebody, we all do. You can be anywhere and people will tell you these miraculous stories about God answered their prayers, this was a miracle, blah blah blah. Miracles are every day it's the interactions we have with our athletes and being able to say hey, how are you doing today? And just talking to a kid. Talk to them like they're yours. Because if they were your kid how would you want them coached? What are you really leaving behind? You want to leave behind a 600lb squatter and a 400 lb. bencher? Is that what you want them to walk away with? Fine, that's great. That's fine. Hopefully that last forever.

BEING MENTORED

Collegiate strength and conditioning coaching is a young and modern profession, beginning in 1958 with Al Roy working with the Louisiana State University Tigers. Despite the profession's less than sixty-year history, and the ever-increasing prominence of technology in coaching as well as the application of science in training, a primary vehicle for learning how to be a strength coach is the traditional apprenticeship model. The pairing of a novice intern or GA with a seasoned coach is a hugely important learning experience for the coaches in this study. The importance of mentorship is reflected in the 640-hour practicum (apprenticeship) required by the CSCCa to sit for the SCCC. To qualify, young coaches must be working with a "master strength coach" holding the MSCCC (Master Strength and Conditioning Coach Certified) designation (CSCCa SCCC Certification Requirements, 2015). Mentorship developed young coaches in a variety of ways – learning correct lifting technique, understanding programming, improving their coaching, etc. What all these learned skills had in common among coaches was the importance of having learned them from a mentor.

Deanna's first mentorship in strength coaching was at her undergraduate institution after ending her collegiate career as a NCAA individual sport athlete. Entering the world of strength and strength coaching as a soon-to-be professional, Deanna looked to all available sources of information to learn how to begin writing programs for athletes other than herself. Her process of learning programming and finding information about writing good programs was very much directed by her mentor:

> He was guiding me, absolutely. He was guiding me. And so he was my mentor, you know, and advisor. And he let me fail plenty of times but not with the athletes, right? So he would have me put together a plan and he would sit and we'd talk about. And, 'this is good,' 'this is not good,' and why. 'Here's what you need to think about.' 'Why are you doing this at this point?' So I had to defend

> and explain what I was doing. Very similar to what we have our interns do now. And what the SCCC certification, that's what we were doing back in the '90s and that's how I was learning.

The experience of learning how to program for sports (especially new sports) is by no means exclusive to Deanna's mentorship. Michelle had the same experience, as did Lloyd, Keith, Jill, and many other coaches. Jill, who trained with her men's team because the women's team did not have a strength coach, sought out her mentorship experience at a much larger university in an adjacent state. Wanting to learn how to better train herself and her team, she interned with the university's head strength coach during the summer before her senior year at which point she functioned as the de facto strength coach for her team. Part of that experience for Jill was learning proper lifting skills, which is also something Lyle talked about in his education as an intern. After graduating from a small Division III school, Lyle took a GA position with a prominent Division I athletic program in his state. Lyle had lifted in high school and college but admittedly basic in retrospect. The summer before his GA position he was able to train with his mentor in an internship to develop his technique executing and coaching lifts:

> Coach [Bernard] was a really good mentor. He was really good technically with things in the weight room so from him I got a good understanding of what good technique was supposed to look like. How to coach and teach, so that helped out a lot. If I had just been going in to start from scratch I probably would have been a little less confident, but I was going into a situation I'd already been in for at least, even if it was only for a month, I knew, I had a lot of confidence in him as a teacher and mentor for me. I felt pretty good about the decision I was making. I was pretty confident, probably overconfident in my knowledge at the time.

Michelle spoke about confidence building through working with her first mentor while still an undergraduate. While she learned lifting technique and coaching from her mentor, as Lyle had, the primary lessons she took from her mentor were about developing

athletes and developing your coaching style and presence such as her experience on the first day of her internship (in "Time in the Field; Time on the Floor) in which her coach told her to "you're a strength and conditioning coach. It doesn't matter if you're a male or a female and you're always confident and you're always gonna coach to the best of your ability." This type of learning for Michelle "was trial by fire, one hundred percent." Andrea reflected on a similar feeling of being thrown into strength coaching as a young coach when talking about why she mentors her interns the way she does in terms of coaching athletes and making sure they understand programming:

> It was never explained to me. I think a lot of coaches aren't taught. They get in the field like I was: You're an athlete. You're in the field. Go! And they aren't taught anything. You learn everything on your own. I always tell the kids I teach that (the graduate students here, I teach the class) and I teach them what took me seven years to finally figure out. You know, so I'm giving you a jump-start, I'm trying to give them some black and white markers, some guidelines, that will help them at least write a basic vanilla program that they can expound upon as they continue to grow.

What Andrea is discussing as passing wisdom on as a mentor comes from what she seems to have felt was an insufficient level of mentorship as a young coach in terms of preparation for the weight room and an understanding of why she was doing what she was doing with her athletes. For the most part, many coaches tended to speak about the opposite experience – of being strongly guided by their mentor in their early days as developing strength coaches. Because of the role she takes in mentoring interns and GAs, Andrea could be more aware of the shortcomings of her own early strength and conditioning education.

Fred expressed similar disenchantment as Andrea with some of the strength coaches he had while still a team sport athlete in college. In part from this experience,

Fred sought out a mentor initially though online mentorship and then in person for the summer before starting at his current institution. Fred said that his mentor, a highly regarded strength coach, taught him how to be a strength coach in ways that still surprise him today. He says, "it's one of those things where, just, the further I get away from that summer that some of the lessons come back that I didn't know were even lessons at the time. Like, holy crap. Like, he was right. Wow, that's why he does that." Fred's enthusiasm for his summer internship with his mentor was driven in part by how much his mentor invested in his learning. He told Fred, "If this is really what you want do I'm going to be hard on you because I want you to be a good coach." While his internship with this mentor was only a few months in the summer, it was a transformative educational opportunity for Fred. Fred shared one experience with his mentor that describes how learning through a mentor interacts with previous experience on the weight room floor, prior education, and other acquired knowledge about strength and conditioning practices. Fred and his fellow interns are thinking about the workload on the athlete:

> We were sitting down after a workout and he was, he was just saying that it was the grind of summer and we were midway through summer workouts. And all of us were in the weight room with the guys and we were all like man, these guys, these guys are frickin beat. Why are we still pushin' so hard? All of us guys were pretty intelligent. I was… of all the interns education-wise, my education came from that I, like, sought it out. I was always just reading books and podcasts and buying ebooks and all that. And everyone else was like Springfield College—it was like kind of the all-star interns from the strength and conditioning colleges—some people had their masters. We're all sittin' there like, ok, are we ever going to do a deload week? Are we just going to keep goin? What's going on? And it's funny, as all of us were thinking that Coach… sat us down and said, 'I know what you all are thinking. You're thinking they're pretty burnt out and they need a break, right?' And all of us didn't want to say, 'yeah, I was thinking that, actually!' He said, 'listen, I know a lot of the textbooks will go against this. I know it's not ideal. But let me tell you something. I've been doing this for 15 years. I've seen a lot of teams and I know when to push, I know when to take

> back. And they keep needing to get pushed, not because of the physical, the physical part of it, but because this team needs a culture change and it's because of the mental component.'

The experiential base of Fred's mentor's lesson about loading his athletes in the summer is similar to the wisdom Ben's head strength coach and mentor shared with him. He reminded Ben that experience accounts for a lot in strength coaching by saying, "[Ben], you're 24 years old, I've been doing this about as long as you've been alive." The experientially-based educational model from the mentors Fred and Ben contrasts with the more academic background of John's mentor in graduate school. His mentor, Dr. Anderson (pseudonym), was highly involved with the *Journal of Strength and Conditioning Research*, the NSCA's highest regarded and most academic journal. Speaking of his first class with Dr. Anderson, John recalls,

> My first class was the one using the Essentials [of Strength and Conditioning] book… they had a separate track there for strength coaches because he [worked with]… the NSCA journal and he's the chair of the department. And I didn't know a lot of this about him going into it and so I'm kind of piecing it together a little bit. And so the first thing he does is he assigns each of us a lift. And we had to do a movement analysis of the lift and a 'pros and cons' type thing and all this stuff. So he assigns me the back squat. So I just start doing some research and the first thing I come across on the NSCA website is written by him. Ain't no lying on this now. Welcome to grad school! So he was really good, he was a huge piece [of my education].

John's mentor, Dr. Anderson, provided him education in the technical side of strength coaching as Lyle talked about earlier with learning lifting techniques and Deanna shared about her education in learning to program routines. Shane, Lloyd, Louis, Lorene, Erik, and Jill all had very similar educational experiences in the non-coaching, technical, aspects of their training. Keith also learned the technical aspects of lifting from his

mentor, a former strength sport coach, and fellow interns as a Graduate Assistant (pseudonyms used for all). Keith spoke about the way mentorship paired with peer-learning helped him develop a knowledge of heavy weight lifting:

> [Alex] was a diehard USAW guy, a diehard Olympic lifter. Coach [Rogers] was coaching him to compete. So I trained with [Alex] a lot to learn the Olympic lifts. This was the second year after Coach [Shepard] had introduced me to what they really were. And then [Jack] at the time was competing in powerlifting. So, uh, I would train with him as far as that goes.

While Andrea expressed some retrospective dissatisfaction with the lack of explanation in her early training as a strength coach, the desire to have gotten more from her mentors is not unique to her. When Michelle was asked at the end of her interview if there was anything else about her professional education she wanted to share for this study, she spoke about wanting to have had a better picture of how challenging it is to get a position in the field of strength and conditioning. Michelle was fortunate to get a strength coaching job in an elite athletic department, but many young coaches are not able to find work at any level as a strength and conditioning coach or chose not to take a position because of low pay. She wishes her mentor had been more candid about the reality of working in collegiate strength coaching:

> I wish someone would have just had a really honest conversation with me. I would have still chosen the field had I know what I was getting myself into, but I would want someone to sit me down and [say,] 'realize that you will probably get paid terribly for the first X amount of years in your life. Realize that the jobs are extremely competitive and that you are pigeonholed in the skills that you have. Realize that, you know, are going to be working extremely long hours.' And that culture hopefully will shift a little bit, but I think there are a lot of things to where you really have to love the field and I think also probably educating people into a backup plan. So, because I think it's so competitive there are opportunities for [degree] minors and things like that in school where you can still go the route that you want but kind of have a way of, like, 'ok, well I know how competitive it is and how hard it is. What's my backup plan?' And wishing that someone had laid

> out those conversations with me. And luckily I made the right decisions in those, but I didn't have someone guiding those decisions. And so I would highly recommend, you know, a really honest mentor in the field. Not only a mentor in kind of showing you the X's and O's of everything, but also a mentor in saying 'hey, you have to really want this. Here's the good and here's the bad and you make your decision.'

Michelle's wanting a mentor to have had a straight conversation with her about what is needed to succeed in the field demonstrates how much a mentor can mean to a young strength coach's professional development and education.

FROM THE CLASSROOM TO THE WEIGHT ROOM

An understanding of the human body is essential to maximize its performance. In the field of strength and conditioning coaching, that understanding includes scientific knowledge of the body. Knowledge of biology, anatomy, physiology, biomechanics, and sports psychology all help prepare a strength coach to implement effective and appropriate training programs. This long held truism in the field that scientific knowledge is critical to train athletes is certainly promoted by the CSCCa and NSCA in the material covered by their certification examinations. Whether or not scientific knowledge is essential, learning about these subjects in the classroom was certainly a part of most coaches' education. This section discusses what coaches learned in class, whether or not it was useful for them, and what they felt they could have learned more about.

Many coaches, like Michelle, Shane, Chad, and Deanna, ~~to name a few~~, felt that science informed their coaching practice. Michelle said that she "love[s] the combination of science and sport" in strength coaching. Expanding on this, Michelle found it "fascinating in a way that you learn how the human body works and you can use that to

your advantage mechanically, on a field, to make you win a competitive athletic event." Thinking back to her time as a team sport and endurance athlete in high school, Michelle spoke about her empirical way of thinking about the training she did for her sport. A self-identified "science- and math-minded person," Michelle said she felt like she naturally questioned why she was training the way she did during practice:

> I wasn't like 'oh, we're running today.' It was always, 'why are we running? 'Well, why does, how does my rest time correlate to my work time?' You know, 'what kind of training effects do I see?' Like, I can go out and run five miles but why am I winded when I'm doing repeat sprints down a field? Like, to me, even at a younger age, there was something more to it than just, run. Or lift. You run, you run fast, you lift weight. There was something, there was something deeper to it and, and I always loved science classes and math classes, you know?

Michelle felt that her natural "inquisitive" and "discerning and observant" qualities inspired and were inspired by her interest in science. From personal interest as well as the importance placed on exercise science knowledge by the NSCA and CSCCa, many coaches talked about pursuing scientific knowledge in the classroom as a formative part of their route into strength and conditioning. After Lorene was well into her schooling she started pursuing exercise science coursework after deciding to switch majors. Of the decision she said, "I declared sport phys, applied for the program, and got in." Lorene was drawn, as she said, to both "the profession and [the] schooling" that accompanied it. She said, "part of [my decision to switch] was I went in and talked with the strength coach who ran that practicum. Sat down and had a discussion with her about strength training and strength coaching and the profession."

The pursuit of science education, from innate interest like Michelle or if it was guided by a mentor like Lorene had, or John talked about with his NSCA journal mentor Dr. Anderson, featured in nearly every coaches' narrative, whether or not they pursued

science coursework. Doug, for example, "kind of floundered around in undergrad. Started off as a PT major and realized how hard pre-med chemistry was. Got out of that. Changed majors a couple times. Took a semester off." All the while, Doug was training hard in classic bodybuilding routine, just "lifting and eating" and gaining knowledge about the body through his own experience in the gym. It wasn't until his graduate work that he studied exercise science.

Chad, on the other hand, had one of the more rigorous educations in exercise science at the undergraduate level and then a master's degree in sports management while a GA. Considering the promotion of exercise science by the NSCA and CSCCa, it is surprising that Chad felt he got far more out of his sports management education than he did from exercise science, which did "not at all" connect to what he was doing as a strength and conditioning intern. Asked if there was any intersection between his science coursework he explains how the controlled environment of science (and classroom education on the subject) does not relate to sport in real life:

> I think the intersection to me was just in understanding the human body. Understanding how the human body worked physiologically, biomechanically. And then the anatomical piece of it where you're talking about anatomy, the bones, the joints, the ligaments, the tendons, and all those things. I think from that point it was a tie-in. When it comes to training an athlete, that classroom work really doesn't transfer to me. It's not applicable. Because you're looking at a chaotic sport and a classroom is a contained environment. And most of the time the studies are very contained and they're very controlled. They are not based on the chaos that takes place between the lines of any given sport. So I felt that most of my teaching came from watching the sport and watching how they prepared for the sport with preparation in the weight room or on the field in their agility training or what have you at the time.

Among other coaches, Deanna and Michelle also found coursework to be of little use in practice. Deanna, an exercise/sport science/physiology major as Chad and many

other coaches in this study were, found her coursework too theoretical, saying her classes lacked

> You know, practical application of things. Everything was just very theory-based… We never went over program design. Well, we may have touched on it in one section of a class and it was your basic 3 sets of 15 and 12 and 10 as your weight goes up, your inverse relationship. Very, very basic. Very what I would call general population training. Not anything that specific to performance related [training]. Any of that kind of stuff I learned on the job and reading books. And talking to people.

Michelle was similarly dissatisfied with her undergraduate coursework. While her classes "did a really good job of giving you just what an undergrad should and that is kind of a holistic view of your field," their practical value was very limited:

> You never get too specialized into much of anything and that was through an exercise science degree... They give you a class in biomechanics they give you a class of exercise phys, anatomy, and you just get this very general idea of what exercise sports science is and I think that's great, but did it prepare me for strength and conditioning? No. I would not have been entirely prepared for the field of strength and conditioning had I just let me undergraduate degree stand-alone… I had no classes on programming, on you know sports conditioning, sports weight training. I took a weight training class but everybody knows that, depending on your university, it's usually a PE credit. It's not the science typically behind it.

The value of a broad education as a strength coach was something that Michelle thought was important for her as well as others. Her assessment of her master's degree, that is was too theoretical and not practical enough, echoed her feelings about her undergraduate degree. She describes one exercise physiology class content: "you might know all there is to know about… post-workout recovery. But… maybe I learned about that for three months out of a six-month course. But that's only a piece, a very small

piece, of the world of strength and conditioning." What Michelle found crucial for her development in her undergraduate was her time as an intern to see "what the field is like." Of her master's coursework she says that "if I hadn't been studying on my own outside of my masters I do not think I would have been prepared for the field" because of the research-focused orientation of the program. Her overall assessment of her education was that "the majority of it, how I think I got specialized in strength and conditioning, was interning with great mentors – so learning from other people – and then reading."

While classes on exercise science were not viewed by the majority of coaches as an important source of education, knowledge of exercise science itself was considered important. Education for these strength coaches came from reading on their own, which is addressed in the next section. What coursework was beneficial for coaches was coursework in sports management, psychology, and education. Erik said that he really developed as a coach through his graduate program in which he could take a broad range of coursework in topics like coach education and coach development while giving him the time to intern.

Of all coaches in the study, Chad reported the greatest benefit from his graduate coursework in sports management (recall that he did not find his undergraduate training in exercise science to be valuable). Asked if his sports management coursework was useful for him as a strength coach, Chad said:

> I think the courses that help me the most were probably the business-oriented courses. Because as much as, you know, as much as it's about coaching, it's about business too. And business ethics and learning how to operate in a business setting. I think some of the business courses when it comes to finances and things like that were very beneficial. Also facility management. I thought the facility management course was going to be redundant and not very beneficial and it turned out to be very beneficial because it showed you how you could work through different facilities, communicate with other facilities, and do different things and set up a facility. So I think from that standpoint it helped a lot. One of

> the projects was to design your own weight room. And so, that was, you know, there are so many things you have to take into consideration that you don't think about from a, electrical outlets, to ceiling height, to where the mirrors are located, to the space in between platforms. To all the things you see in the NSCA manual but then you also see in a business ethics class… It was a very unique course and I was the only strength coach in there at the time so the rest of the people were designing arenas and baseball fields and things like that and here I am designing a weight room, so, it was a unique perspective and allowed me a great opportunity.

While not in a classroom, certification (also formal education) was discussed by only a few of the participants. Most coaches mentioned certification in passing or as something that their mentor said they should pursue to have it—a box to be checked. Allan had all the certifications one would expect of a coach in his position as a way to "legitimize [himself]." The value of certification beyond that was not because of the subject knowledge from the test, but from the professional connections made through getting certified and attending conferences:

> I think they [(certifications)] helped me tremendously as a coach because of the network your build when you take the tests and stuff and the camaraderie within the organization and it makes me really respect the vision of Chuck Stiggins and Boyd have constructed. It was in our best interest. You know, we need a little bit smoother lines of communication, but I think they're vital. They're good for employers to be able to say this guy is certified or this guy is not.

SELF-EDUCATION

Along with the importance of mentorship and personal experience in the weight room, self-education was the most mentioned source of education for strength coaches in this study. Self-education was often reading coaches did to deepen their knowledge in a specific topic or to find out about an entirely new topic—like learning about long duration cardiovascular conditioning for a coach who had been a powerlifter. Whether through books or, especially among post-CSCCa coaches, through the internet, self-

education was largely project-driven. It often responded to an immediate need in programming, exercise selection, learning a new technology, coaching, or another skill needed for the job.

Coaches that were educated earlier, the pre-CSCCa coaches, often referenced "the NSCA book" also known as the *Essentials of Strength and Conditioning* as an essential text they used in learning about exercise science (e.g. physiological responses to resistance or aerobic training) and, especially, how to program workouts. Deanna came from a background in individual sports and later strength sports when she began working as a young strength coach. The programming she had done prior to coaching was largely for herself and, so, her early workouts reflected that background:

> My programs looked like bodybuilder / powerlifter workouts. I knew how to athletes strong. I struggled with how to make them fast. So, yeah, getting athletes strong was never the challenge for me. What was nice, it was difficult at the time, was that the way I was taught was 'here's the team, here's the phase, go and do it.' So at that point I had The Essentials of Strength and Conditioning. So I started to accumulate some books at that point to help me understand.

Louis also spoke to the value of *The Essentials* for programming workouts for sports with which he was unfamiliar during his work as a graduate assistant. When asked how he figured out what his new teams needed, he said:

> It was a combination of talking to the head sports coach in terms of physical needs of those new sports. Relied quite a bit on the basic Essentials of Strength and Conditioning at that time, which I think was probably the, was, part of that current but limited literature at that time. A lot of it was trial and error, you know? And in constant communication with the sports coach, the head strength coach. Seeing what worked, seeing what didn't work.

Coaches turned to popular fitness sources to learn how to implement certain exercises or lay out a workout. While these sources may not have been as helpful as *The Essentials* or a similar text like the famous *Supertraining* by Mel Siff (a foundational book for Shane), they were nonetheless important sources of education as identified by the coaches in this study. Keith, for example, turned to muscle magazines and military-inspired training. Lyle was in a rural area at a time when "the internet was in its infancy" and so only had access to muscle magazines and similar sources, though he felt like he "wasn't looking in the right place" for what may have been better information. Doug also turned to muscle magazines as well as books by renowned bodybuilders Bill Pearl and Arnold Schwarzenegger, as mentioned earlier in the experience of training section.

Andrea lived in rural area with little internet access and, according to her, early on in her career (the late 1990s) there was little useful information available to her online. Andrea, like Lyle, found that

> To learn, you read textbooks and you talked to people. And you trained yourself and that's [how] you kind of figured out what you liked what you didn't like.

While the lack of the wealth of training information online may seem limiting for a young strength coach, Andrea said she feels "bad for the strength and conditioning coaches coming up nowadays cause there's so much information that they outthink themselves. They make things way too complicated. Way too involved and get away from the basic foundations of what every athlete needs." Chad, also a pre-CSCCa coach, learned how to be a strength coach from self-experimentation, experimenting on his group, attending conferences his head coach put on and from his reading at the time:

> It's strange but that's really how I did it. Reading books and seeing practical application of the things I read in strength and conditioning books at the time. Being applied to student athletes.

Along with Shane, Michelle was the coach who spoke the most about how reading played a role in their professional development. Michelle was always someone who loved reading anything – fiction and nonfiction. As a strength coach her reading was directed in two ways:

> Either someone recommends something and they say this is an absolutely phenomenal book and you need to read this or, us you know, to further yourself in this field of strength and conditioning. Or I come up with a questions and I don't know the answer to it and a find a book that gives me the answer. So kind of two angles of either overall books that are kind of pillars in the field of strength and conditioning, I don't think you're going to find a strength and conditioning coach that hasn't read *Supertraining* by Siff or [another] of those very key books. And from there saying ok, for example, I didn't know a whole lot about bodybuilding 'so where's an article where I can read something about bodybuilding?'… So, yeah, I think probably two different ways: having a question or recommendations.

Like college coursework, reading as a form of self-education was not always in the exercise science or even strength and conditioning literature. Allan says he is "not a big traditional strength and conditioning reader. I take a look at some of the Russian manuals and stuff but that's not what you're going to catch me reading. I read a lot more personal development, mental development." The reason Allan's reading is development-oriented is because for him, it makes him "think about the person before I think about the athlete" because "if you put the athlete before the person you're going to have a messed-up individual." Allan was very clear that reading and other professional development, for him, take place in his slow season for strength and conditioning. For Allan, like many coaches in this study, reading was not the most important form of self-education. When he looked for professional development opportunities, they were

largely in the forms of conversations with people both in and outside of strength and conditioning:

> Spoke with some CEOs of companies. Spoke with some aspiring MBAs and those types of individuals, high-caliber individuals. Spoke with some astronauts from NASA. So, you know, there has been a lot of professional development at a higher lever than would typically be assumed. [What I get from these conversation is] the details. How critical the details are. Being prepared and being adaptable. That way you can make an adaptation really easily.

Reaching out to others, in the strength coaching field or otherwise, was important for Louis, Neil, Jill, Erik, Lloyd, and Michelle as well. Peers in the strength and conditioning world helped Michelle stay current and get to process ideas. This wasn't just over the phone or in person as it was for Allan. Michelle reached out to peers through conference and social media as well:

> The older you get in this field the more people that you meet and the more people that you know. You constantly see what they post on social media and see them at conferences and talk to them. For that there's always this pool of knowledge that's being created and these ideas and they might say something that piques your interest or you might be having a conversation with someone on the sideline. They might say 'this is what I do with my team.' You pick up things here and there so I think that at a point where you are connecting and moving up with other people in the field it just starts to be a little bit bigger pool of knowledge… I find strength and conditioning very much a community. You get to know more and more people and so the community grows and the ideas grow and everybody kind of has their own little niche… and maybe I'm great working with conditioning and speed work and so, you just kind of play off of each other and learn from each other.

Fred, a post-CSCCa coach, benefitted from conferences as Michelle did. In addition to his reading, he attended sport coaching conferences while still competing

before transitioning into the strength and conditioning. Commenting on his age and how he best learns, Fred said:

> I'm a 22-year old going to [sport] coaches clinics and people are like 'why are you here? Like, you still play.' And I'm just like, I was like, I dunno, I just love this stuff. I just want to go here cause… I just, I love information. It's ironic because I thought I hated school and all that. But because I am passionate about that stuff I just love, I love hearing how other people do their job well at coaching. How they coach well and everything. So I've always just, if there's just like a, even at 22 I was going to coaches clinic for [my sport]. Cause I wanted to be better at coaching the kids I was working with even if I was just doing it as a part-time job, just like in the off-season, you know. That's where the coaching started.

Fred's excitement and desire to learn was echoed by Ben and his experience as a graduate assistant. Ben said "the thing that I still live by every day is that 'the more you know the more you realize the less you know.' That's something that drives me every day in terms of coaching." This desire to learn more and pursue self-education started for Ben at the university he was working at previous to his GA position. When his mentor told Ben he was going to have to teach him new things to stay up to date in the field himself is when Ben:

> Realized how important it was to carry on what I learned at [my previous university] in terms of educating myself on my own… But I also realized the importance of reaching out to people in the field, creating connections, creating a network, that will help you grow as a strength and conditioning coach. Cause everybody's come from a unique perspective or a different methodology of learning or teaching and so the more people you can, you can learn from and put yourself around the better it's going to make you as a coach. So I think at that point [as a GA] is when I really started to create networks with people to continue to pursue my education besides the research I was continuing to do on my own.

Chapter 5 – Discussion

The purpose of this study was to investigate the means by which the 19 collegiate strength and conditioning coaches at Division I universities in Central Texas were educated and trained to perform their jobs. Grounded theory interviews were conducted and revealed the seven important themes (training experience, athletic background, time coaching, coaching athletes as people, mentorship, classes, and self-education) in the education of these coaches. From these seven themes, a theory of strength coach education was developed. In addition to presenting this theory, this section will discuss how the seven themes and the theory produced from this research contribute to both the scholarship in strength and conditioning coaching and strength coaching as a profession. These results contribute a greater knowledge of collegiate strength and conditioning coaches' educational backgrounds and continuing education practices.

A Theory of Strength and Conditioning Coach Education

Each of the seven themes of education these coaches talked about: training, being an athlete, time spent coaching, learning to coach, mentorship, coursework, and self-education, all work together to develop coaches' proficiency in strength and conditioning for collegiate athletes. Presenting these themes that coaches talked about as important to their education as discrete categories is useful for understanding each in detail, but it does not reflect how the coaches were educated in practice. For both pre- and post-CSCCa coaches, their education generally took the form of Figure 5.1 on the following page.

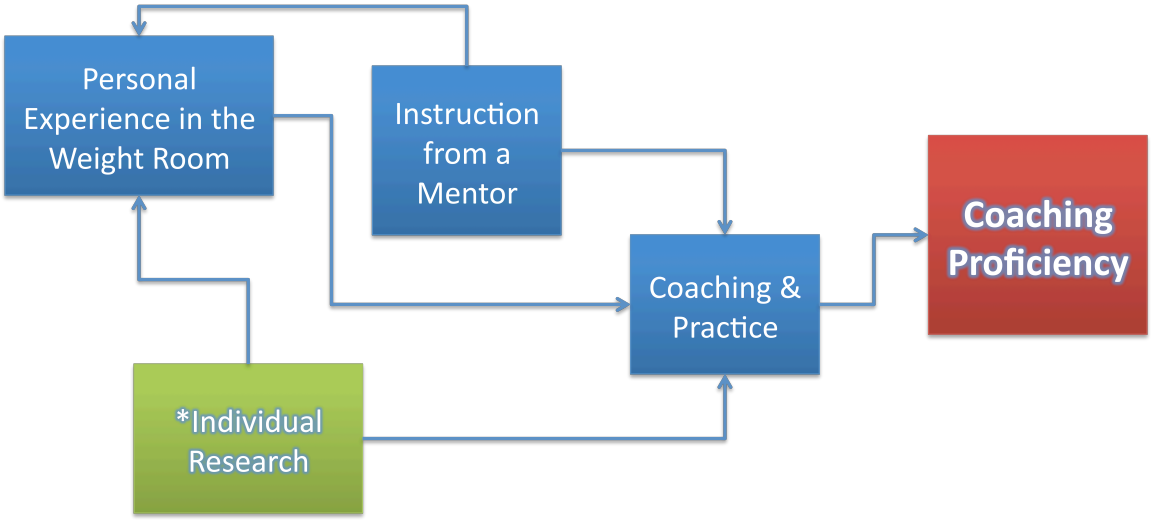

Figure 5.1 – Model of Strength and Conditioning Coach Education

For most coaches, their education began through their "Personal Experience in the Weight Room." Whether that was through first their experience as an athlete like Andrea and Lorene or pursued for its own sake like Doug and Shane did not matter in the greater context of the coaches' professional development. This experience was greatly influenced by "Instruction from a Mentor"—their coaches (Lloyd under Hank or Keith under Coach Shepard) or de facto coaches (Shane's dad and uncle or as Jill acted for her team her senior year). A mentor could also be a peer in this context – anyone a coach consults to help them learn something new or improve their understanding on a topic. In addition to that instruction was the "Individual Research" coaches engaged in to better their understanding of what they were trying to achieve in their own training or to learn something new and test it out. While it may be easy to think of Figure 5.1 as the movement through coaches' development from left to right, this process recurs constantly as a coach develops and learns new ways of bettering their athletes. Lorene, for example,

spoke about regularly using herself as a guinea pig when she wanted to try a new type of programming with her athletes.

The three areas of "Personal Experience in the Weight Room," "Instruction from a Mentor," and "Individual Research" all work together in "Coaching & Practice." "Coaching & Practice" is the crucible in which these strength coaches hone their abilities, testing and retesting new methods and ways of coaching to improve their athletes. If something does not work in "Practice," coaches will return to going through a workout, looking up new information, or consulting with someone to figure out why and how to change it. It is also a space where the coach learns how to coach athletes and work with the culture of their team. It is only through the learning that arising from "Coaching & Practice" that a strength coach develops their "Coaching Proficiency." Unlike a certification or a degree that is attained, that proficiency takes requires a coach to continually update and reflect upon their practice to maintain "Proficiency."

Education for the "pre-CSCCa: Coach.

Among the two age- and experience-related groups of coaches (pre- and post-CSCCa) there were a few educational differences that can best be explained through modification of the general model as seen below in Figure 5.2: Pre-CSCCa Coach Education.

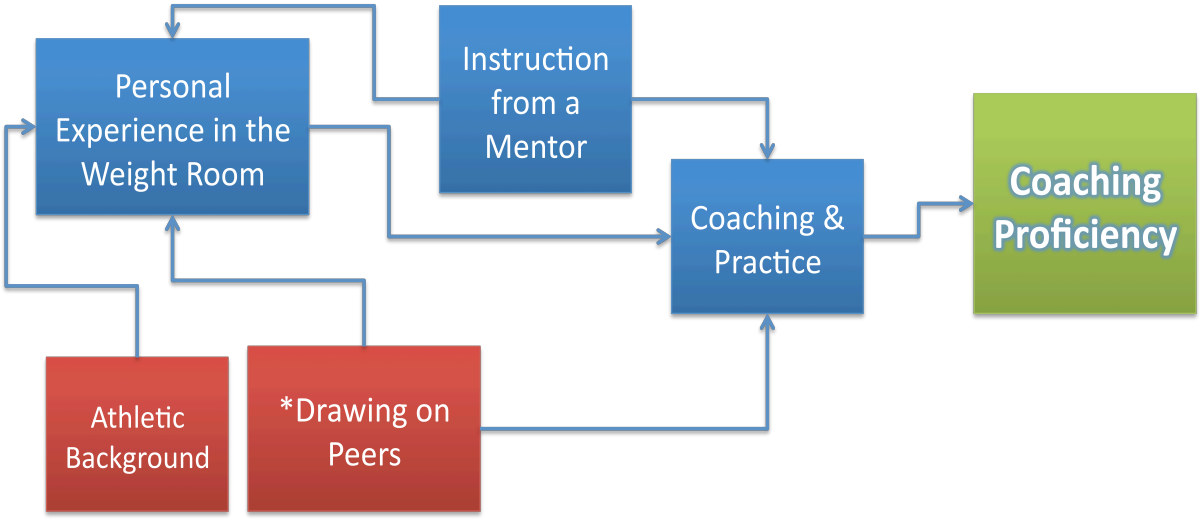

Figure 5.2 – Pre-CSCCa Coach Education

The older and more experienced pre-CSCCa strength coaches differed slightly in how they used "Individual Research" functioned for them. Younger and older coaches alike both turned to books, articles, the internet, and peers in their own research, but the pre-CSCCa coaches turned to their peers in greater numbers than the post-CSCCa coaches. "Drawing on Peers" was more often given as a source of current educational development than was looking information up online or consulting a training book or course. Additionally, the older coaches' "Athletic Background" was more often discussed as an educational development opportunity than it was for the younger coaches.

Education for the "post-CSCCa" coach.

The education of the post-CSCCa coach varied slightly from the general model as well when compared to the pre-CSCCa coaches. Again, these younger coaches still fit the general model of education, they just tended to discuss the difference on Figure 5.3: Post-CSCCa Coach Education on the following page.

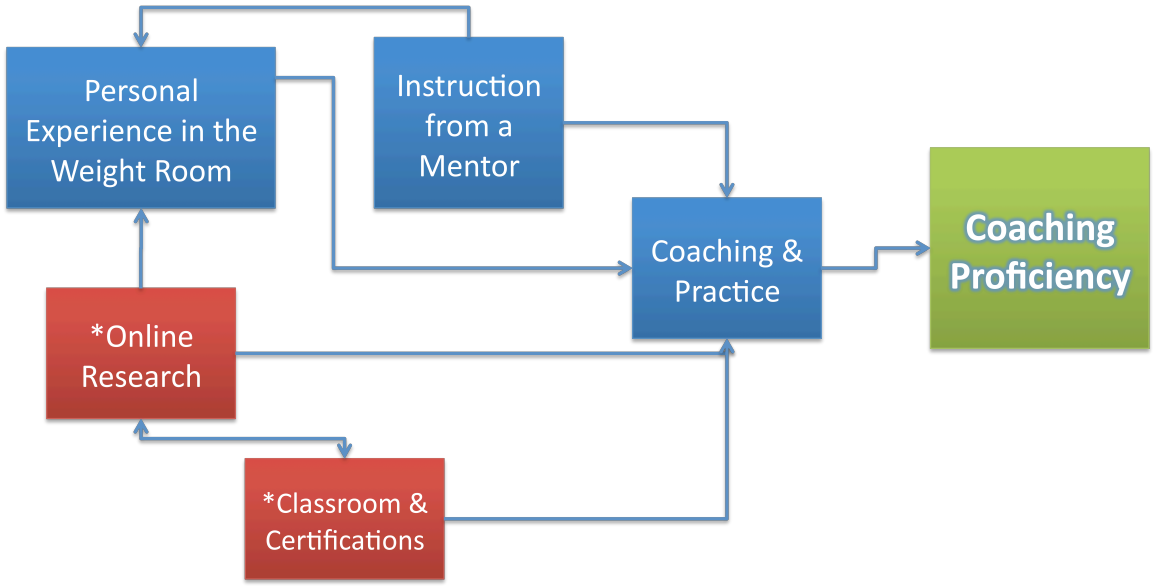

Figure 5.3 – Post-CSCCa Coach Education

Keeping in mind that the post-CSCCa coaches in this study (the younger and less experienced coaches in the study) still follow the general pattern of strength coach education in Figure 5.1, there are primarily differences with this group in how they use "Individual Research." While still drawing on peers to help answer questions, these coaches expressed a much great role of "Online Research" (which includes social media content by coaches as well as online forums) and the role of "Classroom &

Certifications" (the formal modes of learning). With the greater prominence of the CSCCa as well as a slew of fitness certifications, a greater emphasis on "Certifications" is not surprising.

ATHLETIC AND TRAINING EXPERIENCE

Both the current literature and this study discuss the value of competitive athletic experience as well as training experience as critical to the strength coach education. As far back as renowned University of Nebraska strength coach and NSCA-founder Boyd Eply, athletic experience is a common thread throughout both this study (with the exception of Doug, who classified himself as a "non-athlete in high school") and this study. Coaches in this study had varied athletic experience from professional athletics for Everett and Allan to just Division III for Lyle and college club sports for Michelle. Hanratty & O'Connor (2012) found that "a minimum of several thousand hours accumulated as an athlete was a common characteristic of the coaches involved in their study, suggesting a direct correlation exists between playing experience and later success as a [strength] coach (p. 47)."

Playing experience leading to coaching expertise was not covered in the existing literature in the depth that it was addressed herein. Allan spoke most eloquently to how his experience as a former athlete helped him coach in a way his athletes would be receptive:

> Me, I was talking from the know. I was talking from the inside out. I'd been a professional athlete. I was talking to some of the things there were telling their athletes and how it translates for them. So, when you're talking to an athlete, what are they hearing versus what you are saying.

In addition to coaches' experience as an athlete being educationally valuable (particularly for modeling coaching styles), both the literature and this study agree on the importance of early weight training in the education of strength coaches. Shurley (2013) discusses Boyd Eply's athletic career as well as his notable background with weight training. He "was already a serious student of strength and conditioning practices" and trained himself at Nebraska based on his knowledge of "bodybuilding, powerlifting, and weightlifting" (Shurley & J. Todd, 2012, p. 3178).

Where this study expands on the literature is on the educational importance of coaches continuing to lift weights and train throughout their coaching career. As presented in the discussion of Figure 4.3, the value of "Personal Experience in the Weight Room" continues through the development of a coach. Doug spoke to this by invoking the old "never trust a skinny cook" adage. The importance of practicing what you preach in your professional development was said by Andrea, Lorene, Shane, and Michelle. As Doug said, "If I'm going to be a strength coach, I better be a strength coach through and through." He went on to say "there are a lot of strength coaches who know a lot about technology, which is great, there a lot of them who know a lot about technique" but are not effective coaches because they do not have that training background. As Everett talked about with his sport coach, you have to have some way to be validated. For collegiate strength and conditioning coaches, being "physically capable of anything that they do as far as on the strength and conditioning standpoint," in Michelle's words, is the way to validate yourself and gain the attention and respect of your athletes.

EXPERIENCE AND LEARNING TO COACH

Dorgo (2009) notes that a well-trained and educated strength coach is crucial for proper athlete preparation. While strength coaching programs may provide a basis for scientific knowledge about the body and programming, they often result in formal education situations splitting "the knowledge basis for coaching differently from the practical coaching expertise." He goes on to say that "experiential knowledge and informal education in coaching appear to have a special significance in the development of expertise" (p. 17). The importance of informal and experiential knowledge was shown to be a huge piece of coach education in this study. Time on the floor, enduring the 'daily grind' and the 'trial by fire' atmosphere Michelle and Andrea talked about all speak to the importance of practical experience in the weight room coaching athletes.

Ben spoke in particular about how he benefitted from working with a number of teams as a GA. While he learned how to manage a lot of teams, having so many athletes had drawbacks as well:

> I assisted with football, I had baseball, I had track and field, I had Nordic skiing, I had women's golf… I had all those and then I would also help out with any other sports that needed help… I wasn't writing the programming for those sports but again it's just adding to the amount of stuff I had to do that detracts from what I need to do for the teams that I had.

Louis spoke to a similar experience of being extremely busy with teams and so needing to adapt and alter routines within a generalized program. Where there could be more work done in the strength and conditioning literature is whether or not strength coaches are more oriented towards focusing on personal development over performance gains. Allan discusses the importance of developing the person in saying:

> Miracles are every day it's the interactions we have with our athletes and being able to say 'hey, how are you doing today?' and just talking to a kid. Talk to them like they're yours. Because if they were your kid how would you want them

> coached? What are you really leaving behind? You want to leave behind a 600lb squatter and a 400 lb bencher? Is that what you want them to walk away with? Fine, that's great. That's fine. Hopefully that last forever.

BEING MENTORED

Certainly one of the most important parts of this study and the literature on strength and conditioning coach education is the importance of paring with a good mentor. Fred talked about how his brief summer experience with his mentor provides him with lessons he continues to learn today. The antiquated apprentice-mentor model of vocational training was alive and well in this data as well as in the literature. As Gearity, Hudson, & Murray (2014) describe, the "multiple and diverse forms of knowledge to effectively and ethically improve athletic performance" can be developed through a model of mentorship (p. 70). Hanratty & O'Connor (2012) expand on this saying how "mentoring has been seen as an effective experience which allows coaches to develop their skills as a coach" that help them throughout their careers (p. 47).

Nearly all coaches in the study spoke about how important their mentor was in their education as strength coaches. Deanna shared that her mentor "let her fail" with herself on programming and spent the time with her to go through why or why not the program she wrote was good and what she could do to improve it. Much of the mentoring discussion by coaches in this study focused on learning the technical aspects of strength and conditioning as well as learning how to coach athletes.

This study did not reflect the work of Magnusen and Peterson (2012) who talked about the ability of a mentor to help an intern or GA:

> Learn about the ins and outs of organizational behavior as well as what skill sets are required to thrive in the intricate jungle of interpersonal relationships, conflicting personalities, and competing personal and/or organizational objectives. (p. 68).

What was significant between both the pre-CSCCa and post-CSCCa mentors was how important the mentorship was for them. Clearly, this is very much in line with the requirement of the CSCCa that all coaches sitting for the SCCC credential have first completed a 640-hour mentorship with an approved CSCCa-certified master strength coach (holding the MSCCC distinction). While recommended for coach development by the NSCA, it is not a requirement before sitting for the CSCS exam.

FORMAL EDUCATION: CLASSROOM & CERTIFICATION

On the importance of classroom education, particularly science education, is where this study most contradicted the literature. Generally, the nineteen coaches in this study did not speak to exercise science coursework as being formatively educational. William Kraemer's 2005 call to strength coaches to utilize science in their coaching practice, driving their programming decisions by best evidence, was not shared by coaches in this study. It was far more important, instead, to make sure to coaching relationship was in place and then learning about the sciences on their own. Within that equation, coursework held a very small place. Chad's assessment of his undergraduate coursework in exercise science spoke to the feelings of many of the coaches in this study. Both those that did and did not have degrees in sports or exercise science:

> Understanding how the human body worked physiologically, biomechanically. And then the anatomical piece of it where you're talking about anatomy, the bones, the joints, the ligaments, the tendons, and all those things. I think from that point it was a tie-in. When it comes to training an athlete, that classroom work really doesn't transfer to me. It's not applicable. Because you're looking at a chaotic sport and a classroom is a contained environment. And most of the time the studies are very contained and they're very controlled. They are not based on the chaos that takes place between the lines of any given sport. So I felt that most

> of my teaching came from watching the sport and watching how they prepared for the sport with preparation in the weight room or on the field in their agility training or what have you at the time.

Clearly, knowledge of exercise science and how to apply that knowledge is necessary for a strength coach. But approaching it through requirements or recommendations for undergraduate study (as the NSCA and CSCCa do) is not the way the coaches in this study were able to most readily learn these subjects. What this study indicates for those participating coaches at least is that self-education, rather than classroom study, on the exercise sciences if the preferred and more effective way to learn.

Especially since the 2014 certification decision by the NCAA, the need to become certified is essential for collegiate strength and conditioning coaches. In the Brooks, et al (2000) study, twenty-nine of the fifty-three participating coaches said that it was "very important" to have a strength and conditioning certification (p. 486). Though the study was published the same year that the CSCCa began (and fourteen years before the SCCC became accredited), it still speaks to some of the same beliefs about certification among the coaches, all but one of who had at least one of the two major certifications. Allan spoke to the necessity of becoming certified as a way to "legitimize" a coach and "they're good for employers to be able to say this guy is certified or this guy is not."

SELF-EDUCATION

One of the greatest differences between this study and the previous literature was the importance of self-education as the source for coaches to learn about exercise science. Where this study and literature align is the value of reading in general for coaches. As Hanratty & O'Connor said in 2012, "all coaches in [their] study constantly read and researched numerous topics relating to the S&C field to expand on their existing

knowledge" (p. 58-9). Reading was not limited to books but included magazines, journals, and information online:

> Reading has been commonly cited in the literature as a significant learning avenue to expand coaching knowledge... [coaches] possessed a desire to continually learn and develop their knowledge, actively reading and researching to do so. This characteristic was highly evident in the coaches of the current study, with reading providing an effective avenue for learning. Therefore, these findings promote reading and researching as an effective avenue to increase a coach's knowledge in all aspects of the S&C field (p. 59).

From learning about programming and the basics of the field through reading *The Essentials of Strength and Conditioning* to Allan and Lloyd reading personal development and leadership books to better motivate and empathize with their athletes, reading was consistently important to coaches in this study as well as in the Hanratty & O'Connor (2012) study. Coaches who took minimal sports science classes, such as Shane, were able to develop an extensive knowledge base in strength and conditioning through reading on their own. Shane said in his interview that he read *Supertraining* by Mel Siff cover-to-cover and more carefully than he has any other book while he was a GA. He still keeps several spiral notebooks full of his notes that he references to this day.

OVERALL THEMES IN STRENGTH COACH EDUCATION

The 2014 study of Australian rugby strength and conditioning coaches by Hanratty & O'Connor provides a framework of types of learning that is useful in looking at the results of this study. This study's participating coaches' educational experiences are discussed within the learning framework of Hanratty and O'Connor (2014).

- Formal learning - “a situation that is characterised by compulsory attendance, standardised curricula and culminates in certification, commonly seen in the form of many large-scale coach education programs (Nelson et al., 2006)”
    - Formal learning in this study was coursework and certification. While certification was acknowledge as useful and required, it was not necessarily educational. Coursework was perhaps even less useful, for the majority of courses in a practical sense. This was especially true for exercise science coursework, which was more effectively studied by coaches on their own.
- Non-formal learning - “any organized, systematic, educational activity carried on outside the framework of the formal system to provide select types of learning to particular subgroups in the population (Coombs & Ahmed, 1974, p. 8)”
    - Of all the learning styles, non-formal learning holds perhaps the greatest relevance to the educational experiences shared by coaches in this study through their experiences being mentored. From learning to coach to mastering the technical aspects of strength and conditioning, this type of learning was most relevant.
- Informal learning—“the lifelong process by which every person acquires and accumulates knowledge, skills, attitudes and insights from daily experiences and exposure to the environment” (Coombs & Ahmed, 1974, p. 8)”

- Informal learning through personal experience in the weight room and as an athlete as well as outside reading holds the most valued sport with non-formal learning. It is here that developing and established coaches constantly test their programs and ideas through their own, often individual, investigation.

Finally, throughout the study, and the literature (Gearity, Hudson, & Murray, 2014) projects dictated much of the educational experience of strength coaches. Whether writing a workout, learning about a specific type of training or programming, developing a equipment protocol or conference piece, all of these examples from coaches in the study are based around the completion of projects, not of subject knowledge acquisition.

Chapter 6 – Limitations and Future Research

A limitation of this study was the potential variability of recall and reflection by the participants. As the questions in the interviews asked participants to recall and discuss certain educational experiences that may be many years in the past, they may remember things differently than they happened. Nonetheless, the purpose of the study is to assess what the participating coaches perceived to be valuable educationally.

Selection was also a possible limitation in the study. Because the interviewer had a working relationship with a large number of the subjects, those individuals may have censored data that would not reflect well on their current employment situation. For those interviews conducted at other schools, participants could have been reserved to protect, out of competition, what their programs do. However, the researcher did not get the impression that participating coaches held any reservations of that kind.

The practical implications for this study extend to collegiate and non-collegiate strength and conditioning environments. For developing coaches—interns and GAs—this study may provide examples of coach educational development that can be emulated to ensure the areas like self-education, especially, are specific and rigorous enough. Coach educators can use this information to structure internships that address all eight major themes herein as well as incorporate projects that tie in with coursework interns and GAs may be taking. The NSCA and CSCCa can also benefit from this study in how they choose to evaluate strength coaches on the written CSCS and SCCC exams, respectively. In their current format, both exams are structured like a biology test, where information but be memorized and repeated during the test. An assessment truer to the findings of this study would be the completion of several projects.

Further research in this area could take several forms. First, to expand on the questions of interest in this study, this study could be repeated with current interns and graduate assistants at these same universities (or other similar Division I programs) to see how they are viewing their educational experience while in the middle of it. What would be particularly valuable with this group is to see the educational strategies these young coaches pursue and then follow their progress two years out (the standard length of a GA or intern position) to see is they perceive their educational experiences to be valuable. Additionally, this study could also be replicated with Division II or Division III coaches to get a broader picture of collegiate strength and conditioning coaches at all NCAA athletic levels. Data from one or both of these studies could be used to construct a survey with which a broader, generalizable, population of strength coaches could be compared against the findings from this small qualitative sample.

The current employment status (part- or full-time) of the coaches in this study opens an area for further research. As the literature and these participants discuss, becoming hired as a Division I strength and conditioning coach is an extremely difficult thing to do. Because of this and the number of certifications turned out by the NSCA and CSCCa, further research could examine how the coaches that did not make it (either by not being hired or by burning out and quitting) view their educational experiences and whether they were helpful or harmful to them. Such research could also explore how the continuing education and training regimens of these coaches who are unable to find strength coaching positions. Through these negative cases, a much fuller picture of the state of strength coach education could be fully developed.

Finally, one of the seven themes (training experience, athletic background, time coaching, coaching athletes as people, mentorship, classes, and self-education) could be

explored in-depth to understand as fully as possible when the self-education of a post-CSCCa coach tends towards reading social media articles over books, for example.

Chapter 7 – Conclusion

The purpose of this study was to examine the educational experiences of strength and conditioning coaches at the NCAA Division I level in Central Texas. The primary question in this study focused on what caused coaches to pursue one educational or development option and how has it helped them today. Through grounded theory interviews with fourteen male coaches and five female coaches, this study found the role of mentorship, continued personal experience in the weight room, and rigorous self-education (usually project-based) with peer collaboration to be the foundational educational experiences for strength coaches.

For the academic literature on strength coaches, this work contributes an in-depth analysis of how strength coaches have perceived their educational experiences that led them to positions in elite departments. Now that the NCAA finally requires these Division I strength coaches to be certified (effective August 1st, 2015) for the first time in this history of this profession, understanding how coaches perceived their professional training allows researchers to tailor future studies to dig deeper into each experience. From this greater understanding of how strength coaches—as people—think about their knowledge and challenge themselves to be better, the more that can be understood about how strength and conditioning programs fit in within high-performance models of student-athlete development. The studies produced by sports scientists, and the equipment and monitoring technology designed by fitness entrepreneurs can all fail to impact athletes if strength coaches do not know how to learn to use that knowledge and equipment. Within the larger system of a university athletics department, an understanding of how strength coaches operate and perform as it relates to their

professional continuing education presents potential research options for sports management scholars as well.

Outside of academia, this work can impact young and developing strength coaches as well as those established coaches who run their departments' internship educational programs. What can be particularly useful to those individuals is the understanding of how the various components of education (training, mentoring, research) are tested and reshaped through practice as the means to develop coaching proficiency. As these mentorship situations often involve a "pre-CSCCa" coach as the mentor and a "post-CSCCa" intern, both groups can learn from the model herein and understand how the educational structure of each group differs. Finally, an emphasis on project-based learning integrated with mentor-directed self-education in the exercise sciences can provide interns and GAs the ability to tie their theoretical coursework directly to the reality they experience on the weight room floor. Through this process, developing coaches can perhaps not just be more knowledgeable or resourceful with information, but also learn to be keener and more insightful observers of athlete behavior and training responses.

Lastly, these findings provide an important opportunity for the NSCA and the CSCCa alike to reflect on what standards of education should look like for their certified strength coaches. While the results of this study are specific to this small population of coaches, they clearly indicate that strength coaching is very much a mentor-driven profession that approaches theoretical and subject knowledge as needed in a project-based format. The practicum (internship) and practical test (workout program assignment and technical coaching demonstration) for the SCCC credential both fit the model of education consistent throughout this study. Where the SCCC and the CSCS can evaluate their assessment is on their written exams that test recall and conceptual understanding of

a wide range of topics in the exercise sciences, nutrition, sport psychology, and facility design and management. Undoubtedly, there are domains of knowledge are crucial to being a successful strength and conditioning coach (and these data support this assertion). Additionally, these are the type of tests required to become athletic trainers and similar position. Through following the model of this more established profession, the NSCA and CSCCa can help elevate the status of professional strength coaching. However, since strength coaches develop their knowledge through project-based learning, a better test of strength coaching knowledge may be the completion of a project or projects that cover all the subject areas of a test but allows the strength coach to demonstration his or her ability in the medium with which they are most familiar.

Appendix

Consent for Participation in Research

"From Strong Lifters to Strength Coaches: A Grounded Theory of Central Texas Division I Strength and Conditioning Coach Education"

Conducted by Samuel T. Twito, M.Ed.
Department of Kinesiology and Health Education of The University of Texas at Austin, 403 E 23rd St North End Zone, Suite 5.700, Austin, TX 78712, (952) 334-1430, twito@utexas.edu.

You are being asked to take part in a research study. The purpose of this study is to investigate the educational background, job training, and professional education of collegiate strength and conditioning coaches. If you choose to take part, we will ask you to participate in a brief interview about your experience developing the skills and knowledge necessary to train athletes. We expect that it will take between 45-60 minutes of your time in any given session to complete the interview, with total participation time not expected to exceed 120 minutes. You can contact the researcher at the above address and phone number to discuss the study.

The risks of participating in this study are no greater than everyday life. There are no costs for participating. You will not directly benefit from participating. There are no monetary or tangible benefits from participating in this study. The primary benefits to the participants come from potential insights gained from personal reflection on your professional education and how you can help novice coaches with your knowledge. More broadly, the potential benefits of this study come from the knowledge that your are helping advance the field of strength coaching through better coach education practices. You will not be asked to provide your name in the interviews. The data resulting from your participation may be made available to other researchers in the future for other research, but we will never share your identity with these other researchers. The **records** of this study will be stored securely and kept confidential. Authorized persons from The University of Texas at Austin and members of the Institutional Review Board have the legal right to review your research records and will protect the **confidentiality** of those records to the extent permitted by law.

- *interviews will be audiotaped;*
- *recordings will be coded so that no personally identifying information is visible on them;*
- *recordings will be kept in a secure place (e.g., a locked file cabinet in investigator's office);*

- *recordings will be heard only for research purposes by the investigators;*
- *recordings will be erased within one year after they are transcribed and coded.*

All publications will exclude any information that will make it possible to identify you as a subject. Throughout the study, the researchers will notify you of new information that may become available and that might affect your decision to remain in the study.

Your participation in this study is voluntary. You may decide not to participate, choose not to answer any question, or stop participating at any time **without any penalty**. If you want to withdraw from the study or have any questions, contact the investigator listed above. If you have any questions about the study, please call Samuel T. Twito at (952) 334-1430 or send an email to twito@utexas.edu or contact through the mail at 403 E 23rd St North End Zone, Suite 5.700, Austin, TX 78712.

This study has been reviewed and approved by The University of Texas at Austin Institutional Review Board. If you have questions about your rights as a study participant, or want to talk to someone unaffiliated with the research, you may contact - anonymously, if you wish - the Institutional Review Board by phone : +1-512-471-8871, by email : orsc@uts.cc.utexas.edu , or by mail : IRB Administrator, P.O. Box 7426, Mail Code A 3200, Austin, TX 78713.

Interview Guide

Demographic

Age:
Sex:
Race/Ethnicity: How do you describe your racial/ethnic background?
Nationality:
Education completed:
Occupation(s):

Professional Background

How did you get involved with strength coaching?

Who mentored you?

How did you learn to lift? How did you learn to coach lifting?

How long have you worked as a strength coach? Full-time, part-time, GA, intern?

Training/Learning (Education)

Did you take coursework in kinesiology? Do you have a degree in it?

What was your major in college? Any graduate work?

Are you certified? If so, what are your certifications?

Do you attend workshops, clinics, and/or conferences?

How do you stay current?

Do you read journals?

Recruitment via email

Dear Coach _____ ,

My name is Samuel T. Twito and I am a master's student in kinesiology at the University of Texas at Austin and the graduate intern for Longhorns Athletic Performance.
I am contacting you to see if you would be willing to participate in an interview for my master's thesis about your background and education in strength and conditioning. The purpose of this study is to investigate the means by which collegiate strength and conditioning coaches are educated and trained to perform their jobs.

Interview would take place in person and last between 45-90 minutes depending on your availability and will be audio recorded. Should we be unable to meet, I am happy to speak with you over the phone.

If you are interested, please email me back (twito@utexas.edu) or call (952-334-1430). Also, please look through and sign the attached consent form. That form can be mailed back to me or I can get it from you in person when we meet.
Thank you for your time and your interest. I hope to be able to speak with you soon.

Sincerely,
Samuel T. Twito, M.Ed., CSCS

Graduate Student || Sports Management
Graduate Intern || Longhorns Athletic Performance
University of Texas at Austin

Recruitment via phone script
"Dear Coach _____ ,

My name is Samuel T. Twito and I am a master's student in kinesiology at the University of Texas at Austin and the graduate intern for Longhorns Athletic Performance. Do you have a moment to speak?"

Coach: ……

"I am contacting you to see if you would be willing to participate in an interview for my master's thesis about your background and education in strength and conditioning. The purpose of this study is to investigate the means by which collegiate strength and conditioning coaches are educated and trained to perform their jobs. Would you be interested in speaking?"

Coach: …….

"Interview would take place in person and last between 45-90 minutes depending on your availability and will be audio recorded. Should we be unable to meet, I am happy to speak with you over the phone."

Coach: ……..

"Thank you. I will/have email[ed] you a consent form. That form can be mailed back to me or I can get it from you in person when we meet."

Coach: …….

"Thank you for your time and your interest. I look forward to speaking with you on Day/Month/Time. Have a good day."

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